

Spatial Data Standard (SDSFIE) & Facility Management Standard (FMSFIE) for facilities, infrastructure, & environment - Environmental Restoration & Compliance

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Environmental Engineer

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for facilities, infrastructure, and environment
CEERD-ID-C

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at Waterways Experiment Station

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Tri-Service Center Internet URL : <http://tsc.wes.army.mil>

About the Center

- Mission Statement

CADD

Establish a multi-agency vehicle to coordinate facilities, infrastructure and environmental use of Computer Aided Design and Drafting and Geographic Information Systems (CADD/GIS) activities within the Department of Defense (DOD) and with other participating governmental (federal, state and local) agencies, and the private sector. This includes setting standards, promoting system integration, supporting centralized acquisition, and providing assistance for the installation, training, operation, and maintenance of CADD/GIS and facilities management (FM) systems.

GI
S

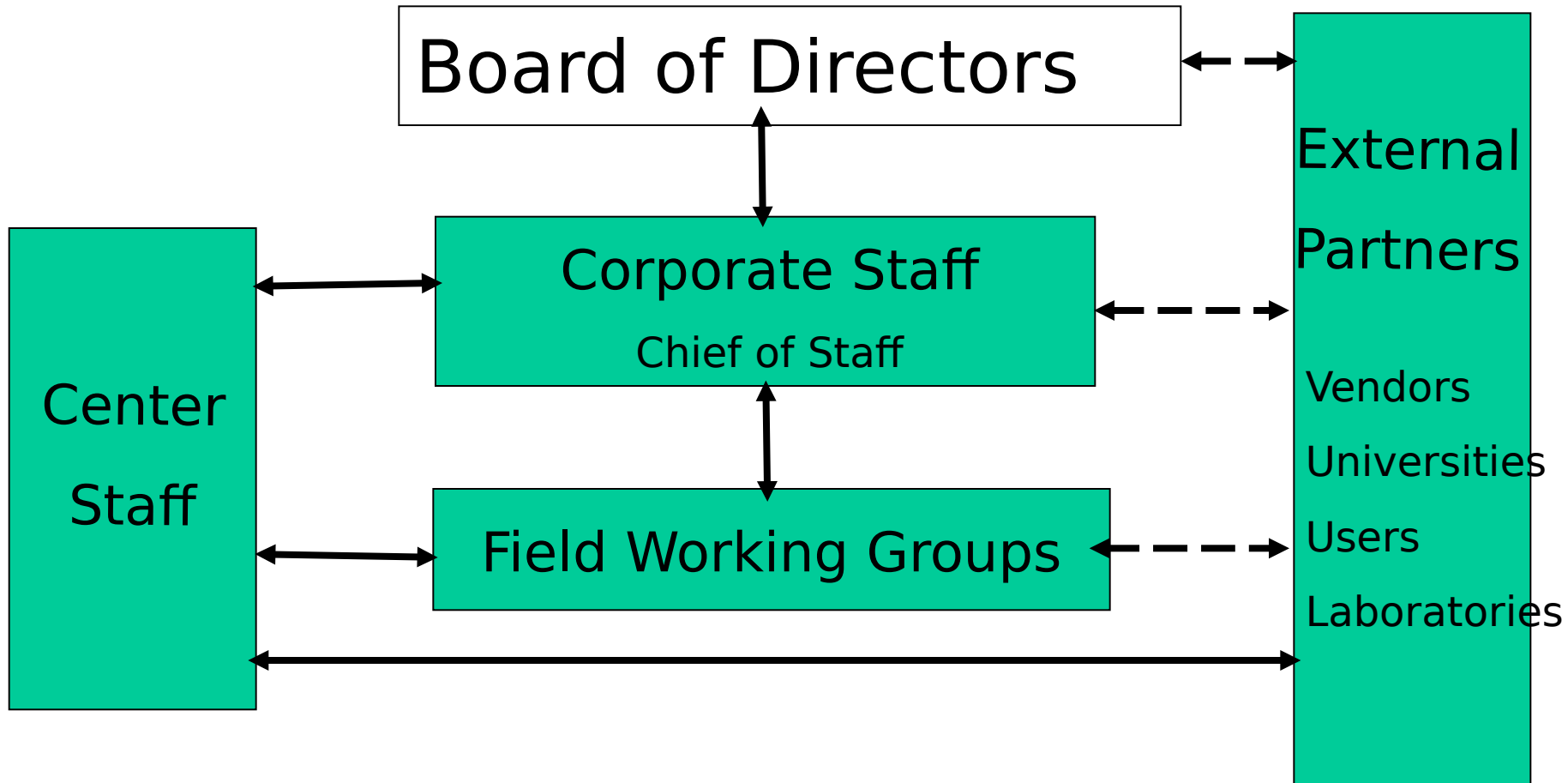
Center History

- 1987 Corps established CADD Center at WES
- 1989 CADD Center Expanded to Included DEHs
- 1990 CADD Center Expanded Activities to include GIS
- 1991 June, DMRD 982 Recommended Tri-Service
CADD/GIS Technology Center at WES
- 1992 August, MOU signed by all 3 services and
Corps Civil Works Directorate
- 1992 October, Tri-Service CADD/GIS
Technology Center established at WES
- 1995 Coast Guard Joined the Group
- 1997 DLA Joined the Group
- 1999 Expanded CADD/GIS Role to other Federal Agencies

CADD/GIS Technology Center

for facilities, infrastructure, and environment

Organizational Chart



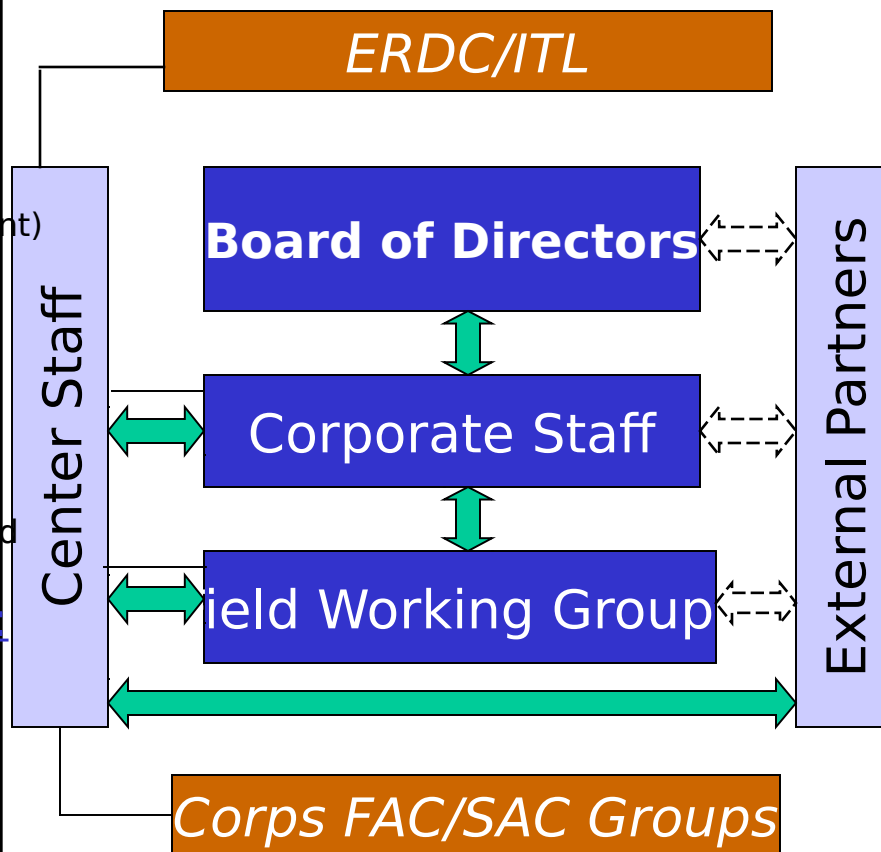
The *New* CADD/GIS Technology Center

Federal Partners:

- USACE
(Military Programs)
(Civil Works)
(Research and Development)
- Naval Facilities Command
- Air Force Civil Engineer
- Marine Corps
- General Services Admin.
- NASA
- Coast Guard
- Department of State
- Defense Logistics Command
- FAA

Federal Associates:

- Architect of the Capitol
- Army Reserve
- National Guard
- Veteran;s Affairs
- EPA
- Department of Interior
- DOE



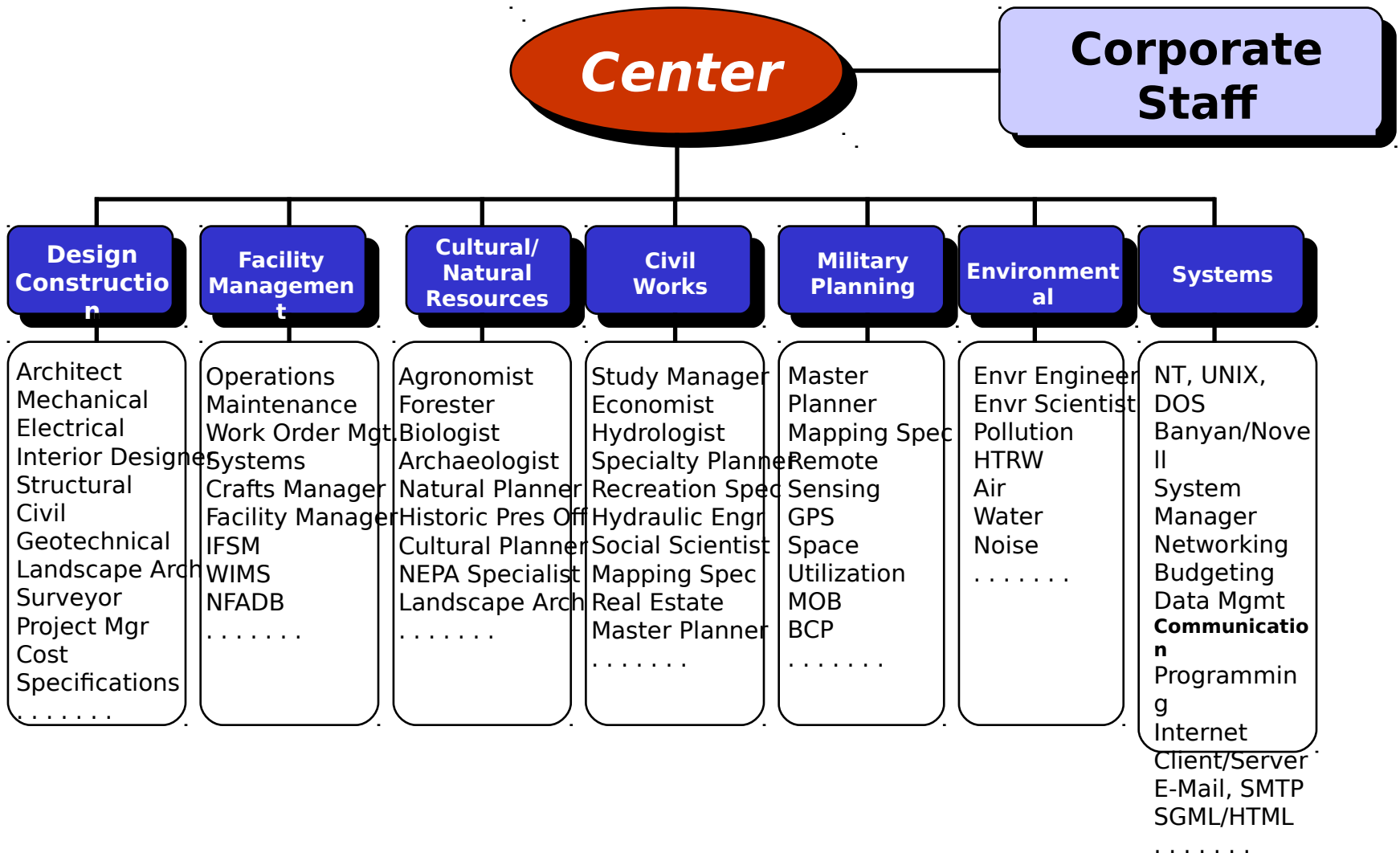
Industry Associates:

- ESRI
- Autodesk
- Bentley
- Intergaph

Societies/Organization

- NIBS
- CSI
- AIA
- IFMA
- ISO
- ANSI
- ASTM
- ACS
- Nature Conservancy
- OGRIP
- PaMAGIC
- National Assoc. of Counties

Field Working Groups



Environmental Field Working Group (FWG)



FY2001 Chair - Parrish Swearingen

FY2001 Vice-Chair - Burla Martin

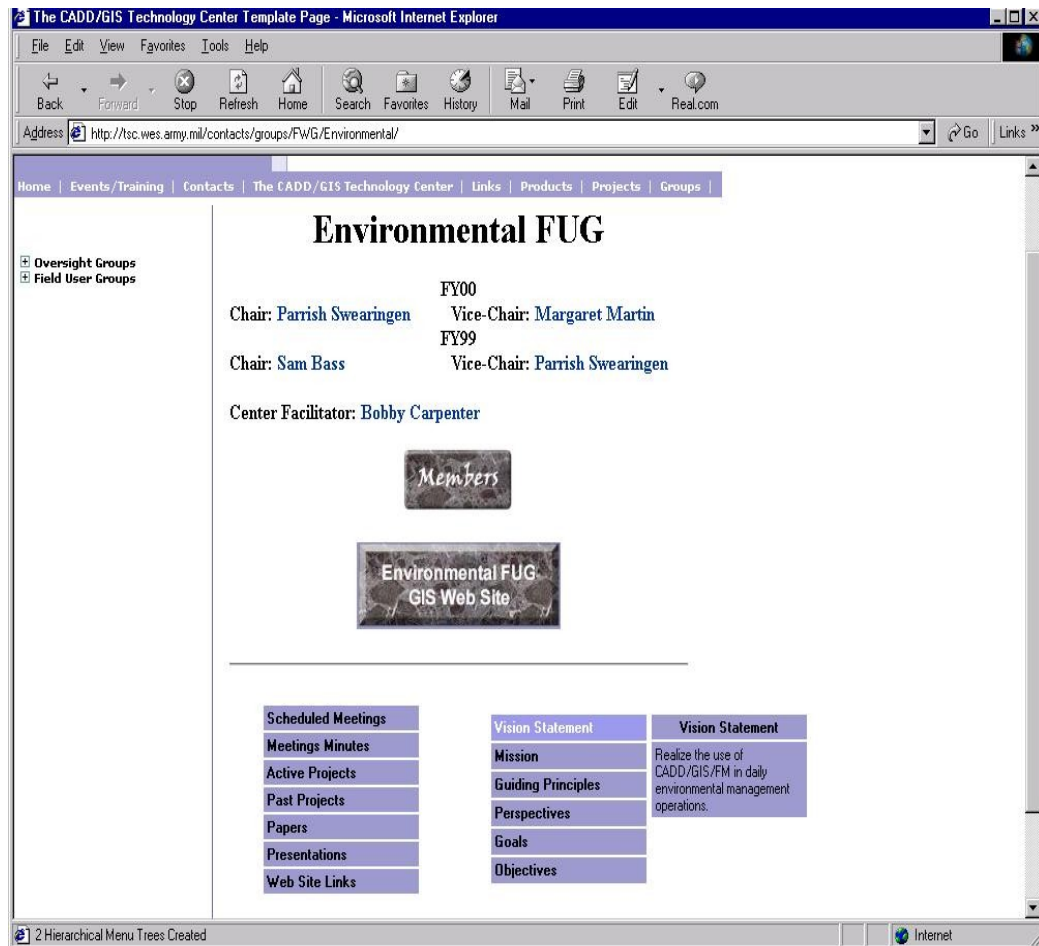
- Corps 2 Sam Bass (HTRW Center), Margaret Martin
(Baltimore District)
- Navy 3 Tom Stephan (Northern Div., NAVFAC),
Darrell Molzan (So. Div. NAVFAC), Lasandra
Teeters (Patuxent River Naval Air Station)
- Air Force 2 Parrish Swearingen (Robins AFB), Tom
Griffith (AFCEE)
- Army 1 Burla Martin (Ft. Carson)
- Marines 1 Gerald O'Hara (Quantico)
- Total 9

Environmental Field Working Group

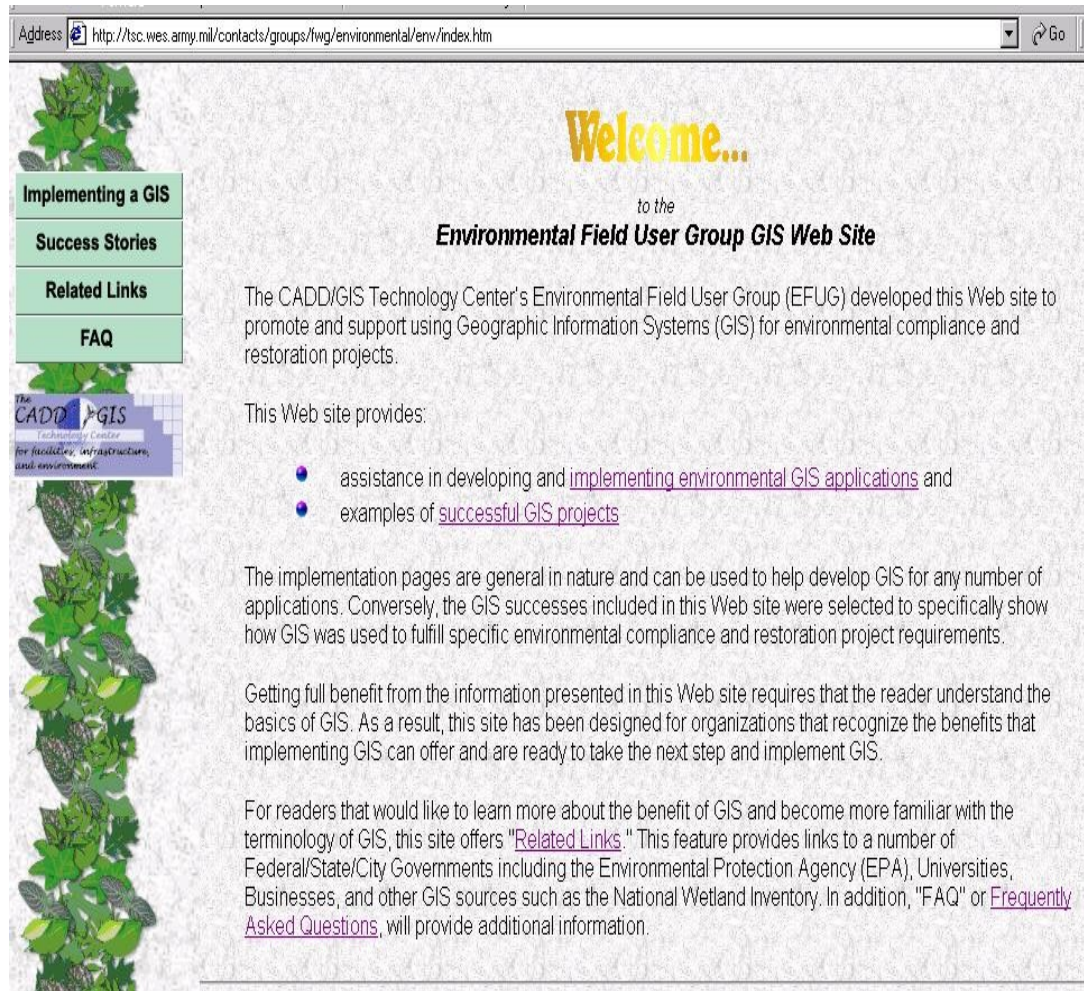
Internet Website

- Go to CADD/GIS Technology Center Website (<http://tsc.wes.army.mil>). Then select “Groups” & “Environmental”.

- Contains information on projects, Environmental Restoration & Compliance GIS related topics, & meeting minutes.



FY99 Project Number 97.022 - Develop Guidance & Demonstrate Use of GIS Technology for Environmental Restoration & Compliance Applications



- Developed Guidance & Provided Success Stories Concerning Use of GIS Technology for Environmental Restoration & Compliance Applications
- Completed in September 1999 and posted on Center's Environmental FUG Web Site in October 2000.

Development of SDSFIE/FMSFIE to GMS Interface

Address  <http://chl.wes.army.mil/software/gms/>

@ home
CHL

- [Overview](#)
- [New Features](#)
- [GMS Modules](#)
- [GMS Supported Models](#)
- [Visualization](#)
- [Conceptual Modeling Approach](#)
- [System Requirements](#)
- [Download GMS](#)
- [GMS Documentation](#)
- [GMS Registration](#)
- [FAQ](#)
- [Support](#)
- [Policy](#)

[Take a look at SMS and WMS](#)


**Department of Defense
Groundwater Modeling System**

The Department of Defense Groundwater Modeling System (GMS) is the most sophisticated groundwater modeling environment available today.

[Watch A Movie About GMS!](#) 

Current GMS version - 3.0


The Department of Defense, in partnership with the Department of Energy, the U.S. Environmental Protection Agency, Cray Research, and 20 academic partners, has developed the DoD Groundwater Modeling System. The GMS provides an integrated and comprehensive computational environment for simulating subsurface flow, contaminant fate/transport, and the efficacy and design of remediation systems.

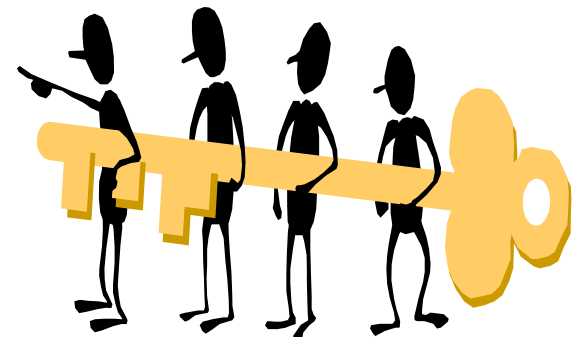
GMS integrates and simplifies the process of groundwater flow and transport modeling by bringing together all of the tools needed to complete a successful study. GMS provides a comprehensive graphical environment for numerical modeling, tools for site characterization, model conceptualization, mesh and grid generation, geostatistics, and sophisticated tools for graphical visualization. What's more, all this is available for both PC and UNIX based operating systems.

Objective: Develop electronic interface to extract data from a Spatial Data Standards (SDSFIE) & Facility Management Standards (FMSFIE) compliant GIS database and load it into the Department of Defense (DoD) Ground Water Modeling System (GMS) for environmental groundwater modeling and analysis.

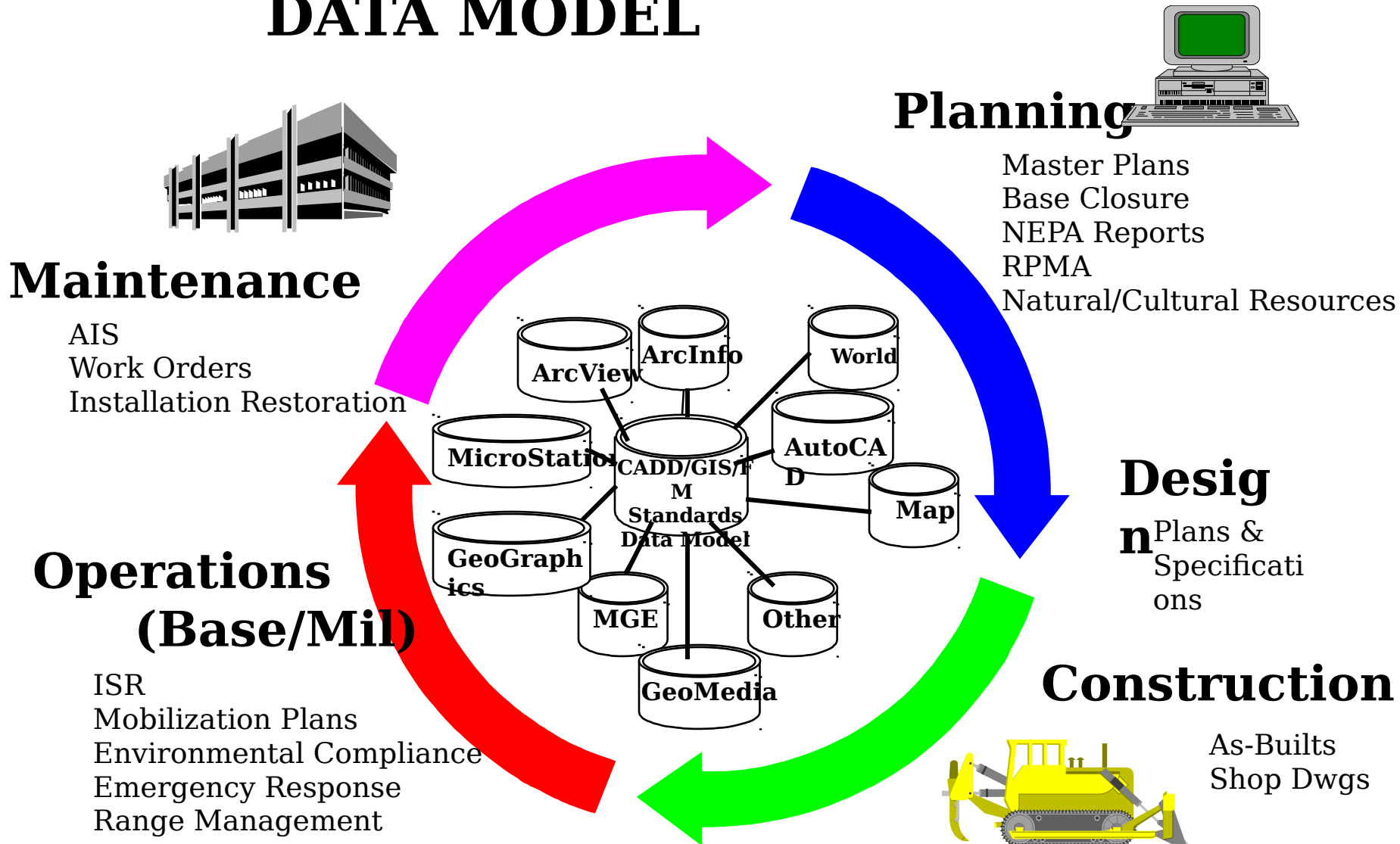
The Center's Approach to Standards

• Current Efforts

- Architect-Engineer (A-E) Deliverables Guidelines
 - A/E/C Guidelines
 - GIS/Spatial Data Guidelines
- Architectural/Engineering/Construction (A/E/C) CADD Standard
- Spatial Data Standard (SDSFIE) (GIS)
- Facility Management Standard (FMSFIE) (GIS & CADD)
- Electronic Bid Solicitations (EBS)
- CADD & GIS Object Standards



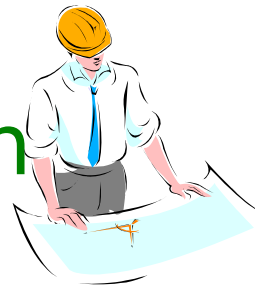
LIFE-CYCLE PROJECT DATA MODEL



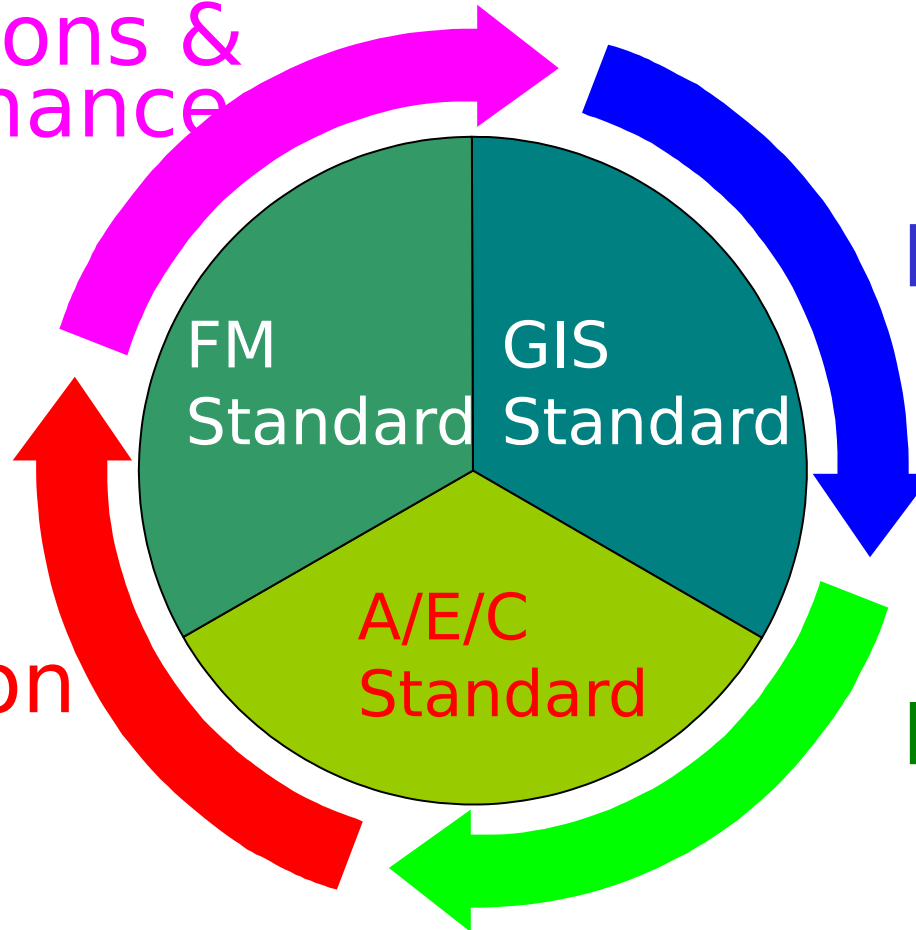
Life-Cycle Project Model



Planning



Design



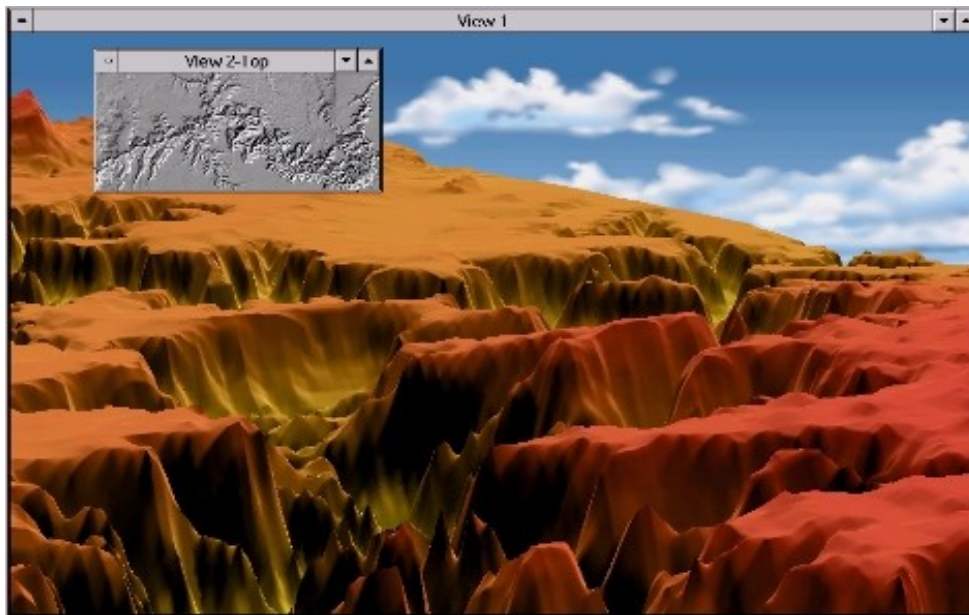
Operations & Maintenance



Construction



What is *GIS* ?!?!?



Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:
Planar:

Grid_Coordinate_System:

Grid_Coordinate_System: State Plane
Coordinate System 1927

State_Plane_Coordinate_System:
SPCS_Zone_Identifier: 1001
Transverse_Mercator:
Longitude_of_Central_Meridian:

-082.166666

Latitude_of_Projection_Origin:

+30.000000

False_Easting: 500000

636-1044	Neumann Donald L. 5 Bugle Ridge Dr.	638-1423
638-3004	Neumann Robert A. 511 Newitt Vick Dr.	638-8426
634-8689	Nevels A. M. 4101 Flewelles Rd.	636-8097
636-4167	Nevels Chris. Paces Ridge Apts.	634-1384
636-2052	Nevels Connie. 85 Chickasaw Ln.	634-8862
634-0223	Nevels Donna. 116 Belva Dr.	636-1986
638-1474	Nevels Hazel. Chickasaw Subdivision.	638-2793
636-4057	Nevels Jim. 3014 Washington.	634-1095
638-5460	Nevels Johnny Jr.	638-5831
636-0584	Nevels Kristy. 4405 S. Gibson Rd.	636-7704
638-4843	Nevels Leon. Old Hwy 27.	638-7034
	Nevels Loyd Mrs. Standard Hill Rd.	638-6424
	Nevels Patricia. Hwy 81 N.	636-6382
	Nevels Ricky & Tabatha.	634-6304
	Nevels Scott Jason & Keeley.	634-8222
	Nevels Terry. 271 Magnolia Rd.	638-0809
	Nevels Warden Mrs. Hwy 81 N.	636-2978
	Nevels Wayne Q.	

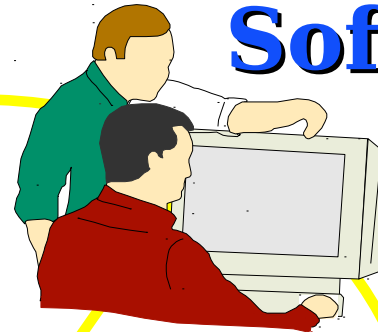
A system for capturing, storing, retrieving, analyzing, and displaying geographically referenced information, i.e. data identified according to its location on the earth.

Geographic Information System

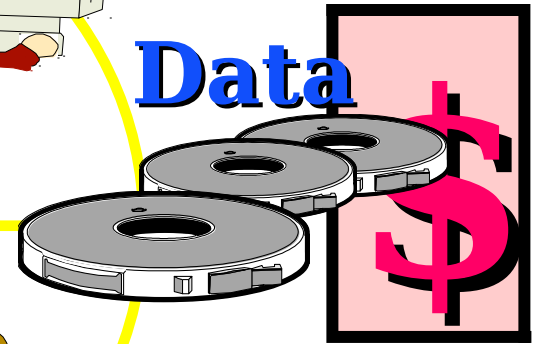
People



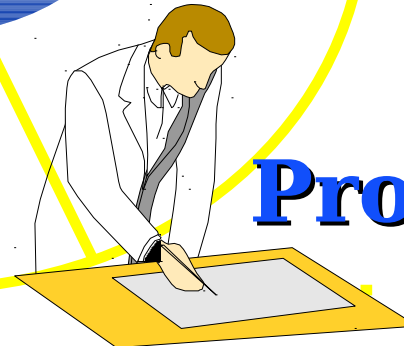
Software



Data



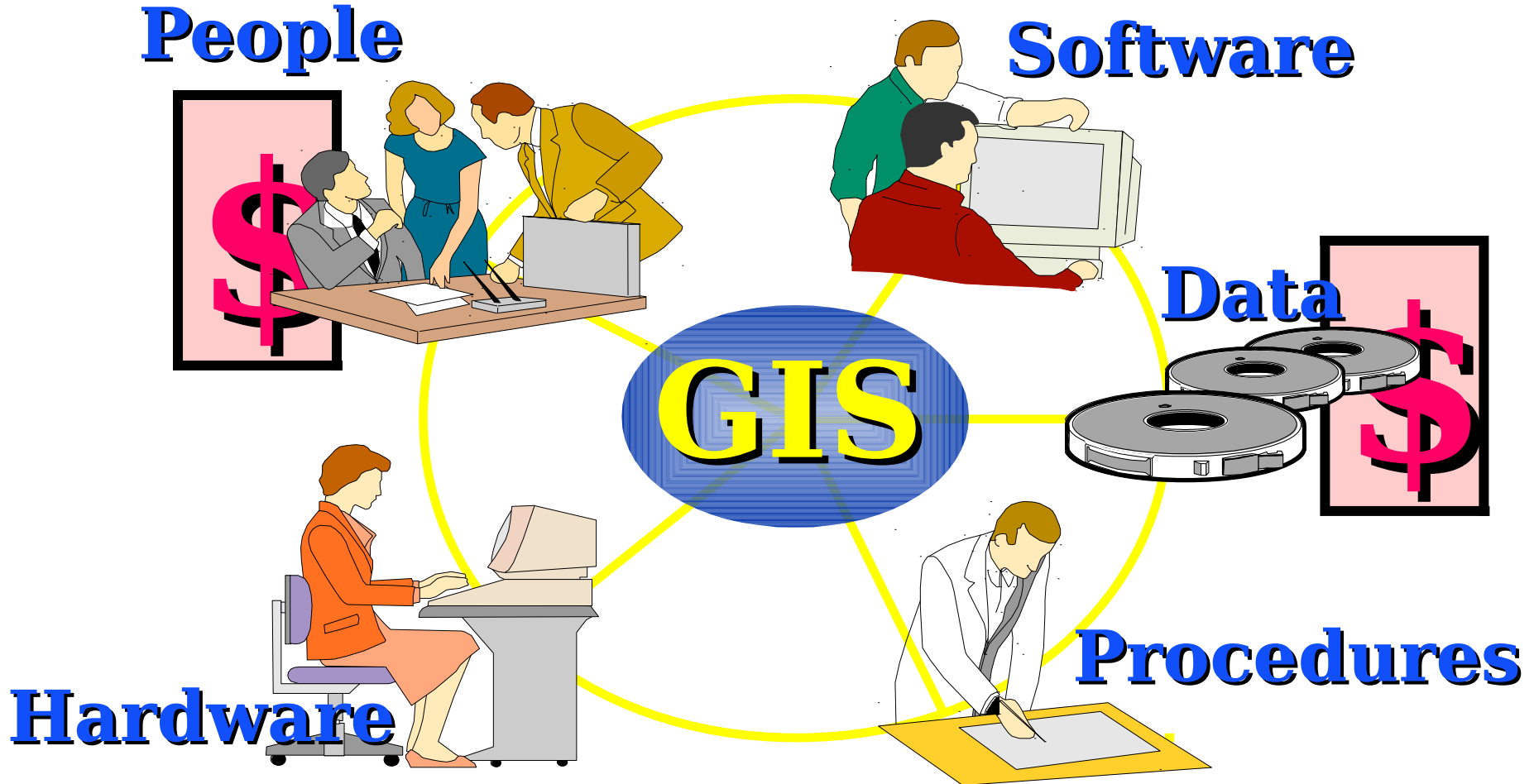
Procedures



Hardware



GIS



Spatial Data Standard (SDSFIE)

for facilities, infrastructure, & environment

- Provides a standard graphic and nongraphic (database) format and structure for GIS implementations.
- Provides a “nonproprietary” standard designed for use with commercially available “off-the-shelf” GIS and relational database software.
- Provides a GIS implementation schema for approved FGDC geospatial related data standards, and appropriate DISA data elements.
- Provides a grouping of geographically referenced (geospatial) features (i.e., features which can be depicted graphically on a map at their geographic location (coordinate). Each geospatial feature has an “attached” Attribute Table containing pertinent data

Facility Management Standard (FMSFIE)

for facilities, infrastructure, & environment

- Initial Development has focused on:
 - Providing a standard database format and structure for temporal, “business”, and event data (e.g., inspections, repairs) related to SDSFIE geospatial features and/or A/E/C CADD objects.
 - Providing a “nonproprietary” standard designed for use with commercially available “off-the-shelf” CADD, GIS, FM, and relational database software.

GIS/FM Standards Development Coordination

- All DoD Organizations
- Other Federal Agencies
 - US Coast Guard
 - Veteran's Administration
 - Indian Affairs
 - GSA
 - EPA
 - FAA
 - Census Bureau
 - NASA
 - CIA
 - DOE
 - USGS
 - U.S. Forest Service
 - Housing and Urban Development
 - Panama Canal Commission
 - Tennessee Valley Authority
 - Department of Transportation
- CADD/GIS/Database Software Vendors
 - Intergraph
 - Bentley
 - Autodesk
 - ESRI
 - FIS
 - Maximo
 - Oracle
 - Microsoft
- Numerous State & Local Government Organizations, Universities, etc.
- Numerous Architect-Engineer Firms & Contractors

Coordination Efforts With DoD & Federal Standards Development Initiatives Include:

- Federal Geographic Data Committee (FGDC)
 - *Center* Participation
 - Adoption of Subcommittee Products
 - Adoption of Metadata Standards
- Defense Information Systems Agency (DISA)
- Corporate Information Management (CIM) Initiatives
- Defense Environmental Security Corporate Information Management (DESCIM) Initiatives
- National Imagery and Mapping Agency (NIMA) (formerly Defense Mapping Agency (DMA)) Initiatives

MAJOR CONTRIBUTORS TO ENVIRONMENTAL HAZARDS ENTITY SET

- Tri-Service CADD/GIS Technology Center's HTRW/Environmental Field Working Group.
- Defense Information Systems Agency (DISA) Defense Data Dictionary System (DDDS).
- Air Force "Installation Restoration Program Information Management System" (IRPIMS).
- USAE District, Alaska "Environmental Data Management System" (EDMS).
- Army Environmental Center "Installation Restoration Data Management Information System (IRDMIS).
- Defense Environmental Security Corporate Information Management (DESCIM) Program initiatives.
- SW Div, NAVFACENGCOM "Navy Environmental Data Transfer Standard" (NEDTS).
- USAE "Formerly Used Defense Site (FUDS) Database - Users Guide".
- AF Aeronautical Systems Center (ASC) and USAE District, Louisville "Draft System Specification for the Technical Data Management System".
- Working GIS's, e.g., Edwards AFB & Patuxent River Naval Air Station GIS's.

Benefits of Using a GIS Data Standard

- Standard GIS and FM Data Collection Requirements
- One Training Program
- Common GIS and FM Software Applications
- Standard Implementation Procedures and Requirements
- Common Data Model which Permits the Sharing of Data
- Nonproprietary Data Model (SDSFIE & NCITS 353)

Benefits of Using a GIS Data Standard

♦ Common Data Model which Permits the Sharing of Data

– Fort Bragg

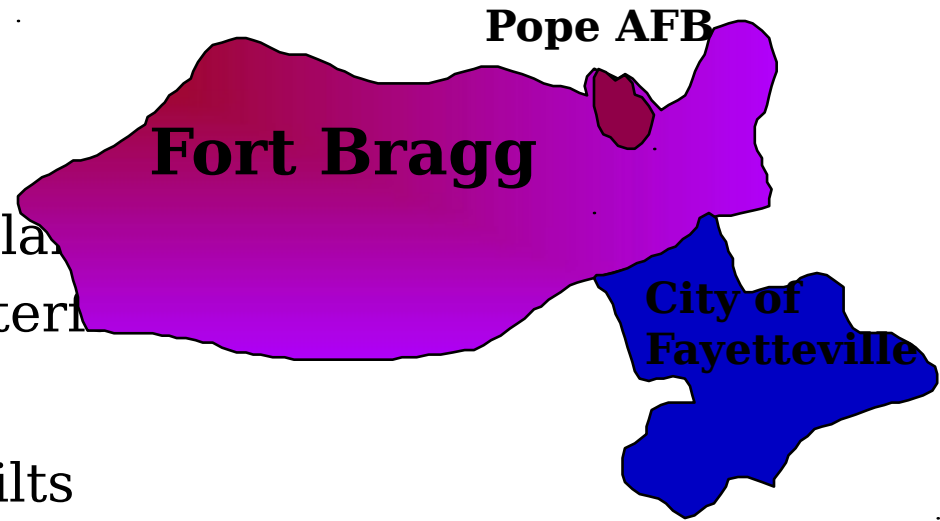
- ♦ Pope AFB Assets
- ♦ BRAC and Mobilization Plan
- ♦ Utilities and Drainage Interface

– Pope Air Force Base

- ♦ Site Drawings and As-Builts

– City of Fayetteville

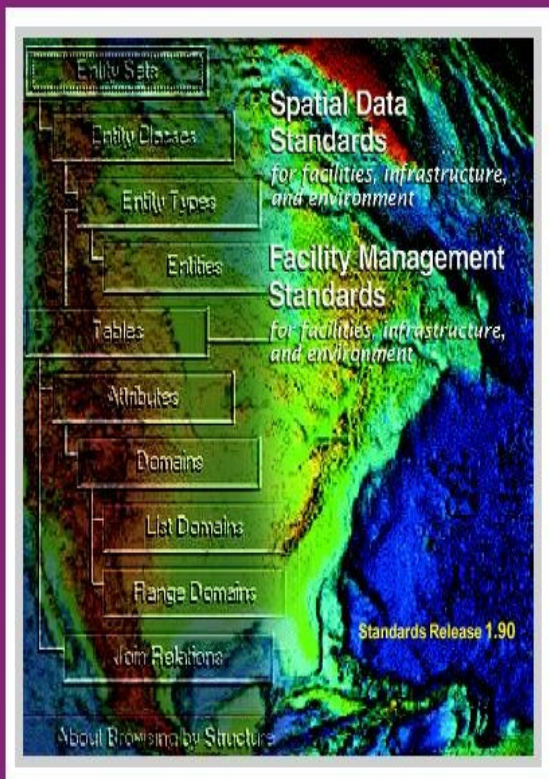
- ♦ Hurricane Evacuation Plan
- ♦ Cadastral Data and Demography
- ♦ Utilities and Drainage Interface



Benefits of Using a GIS Data Standard

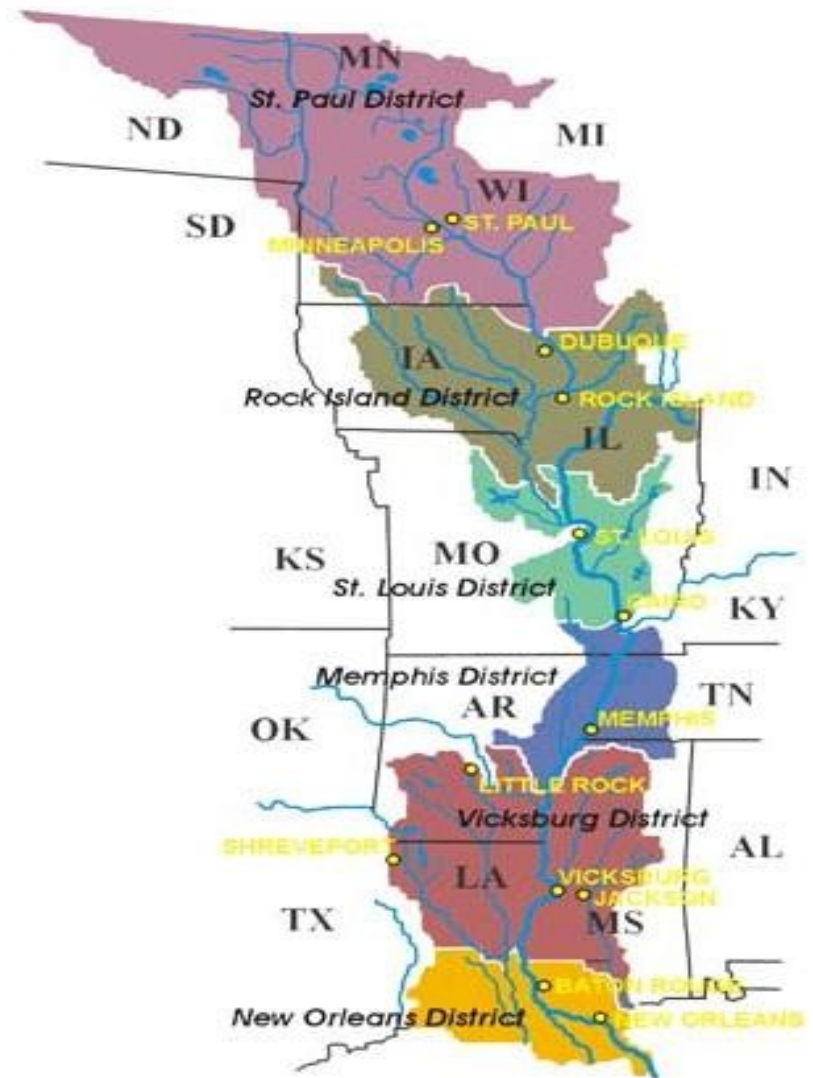
One Training Program

- Total of 7 SDSFIE Implementation Workshops provided in FY99 - FY2001.
- Total of 222 students.
- Next Workshop scheduled for February 5 - 7, 2002



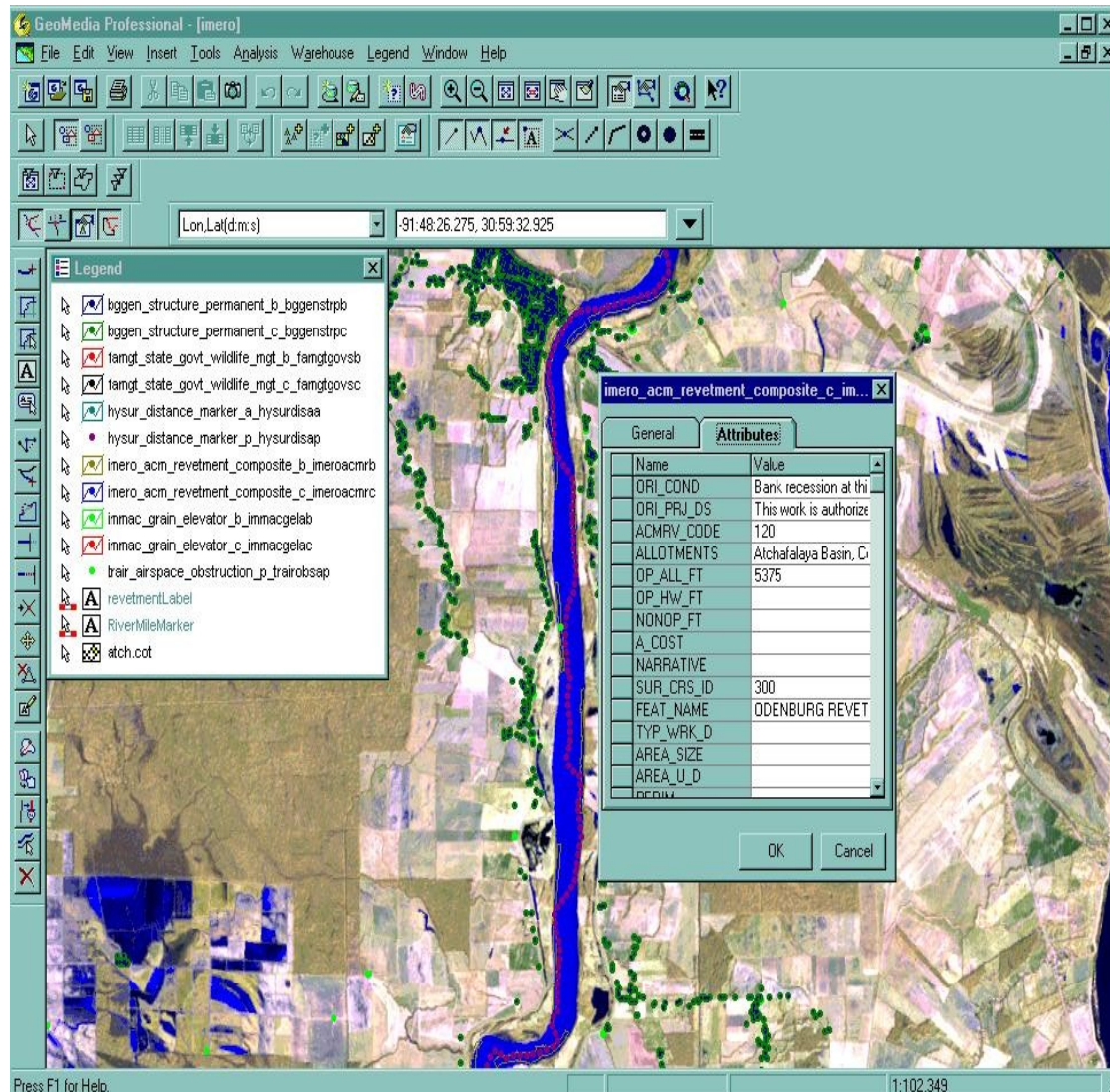
Benefits of Using a GIS Data Standard

- U.S. Army Corps of Engineers Mississippi Valley Division (CEMVD) adopted SDSFIE as GIS Standard for their GIS (called Regional Engineering & Environmental GIS (REEGIS)).
- REEGIS is used by all Six Districts within their Division. Each District maintains their part of REEGIS.
- Some Districts use Intergraph MGE & GeoMedia, whereas other Districts use ESRI ArcView, ARCINFO, & ArcGIS.
- Geospatial data can be shared between Districts & MVD, even



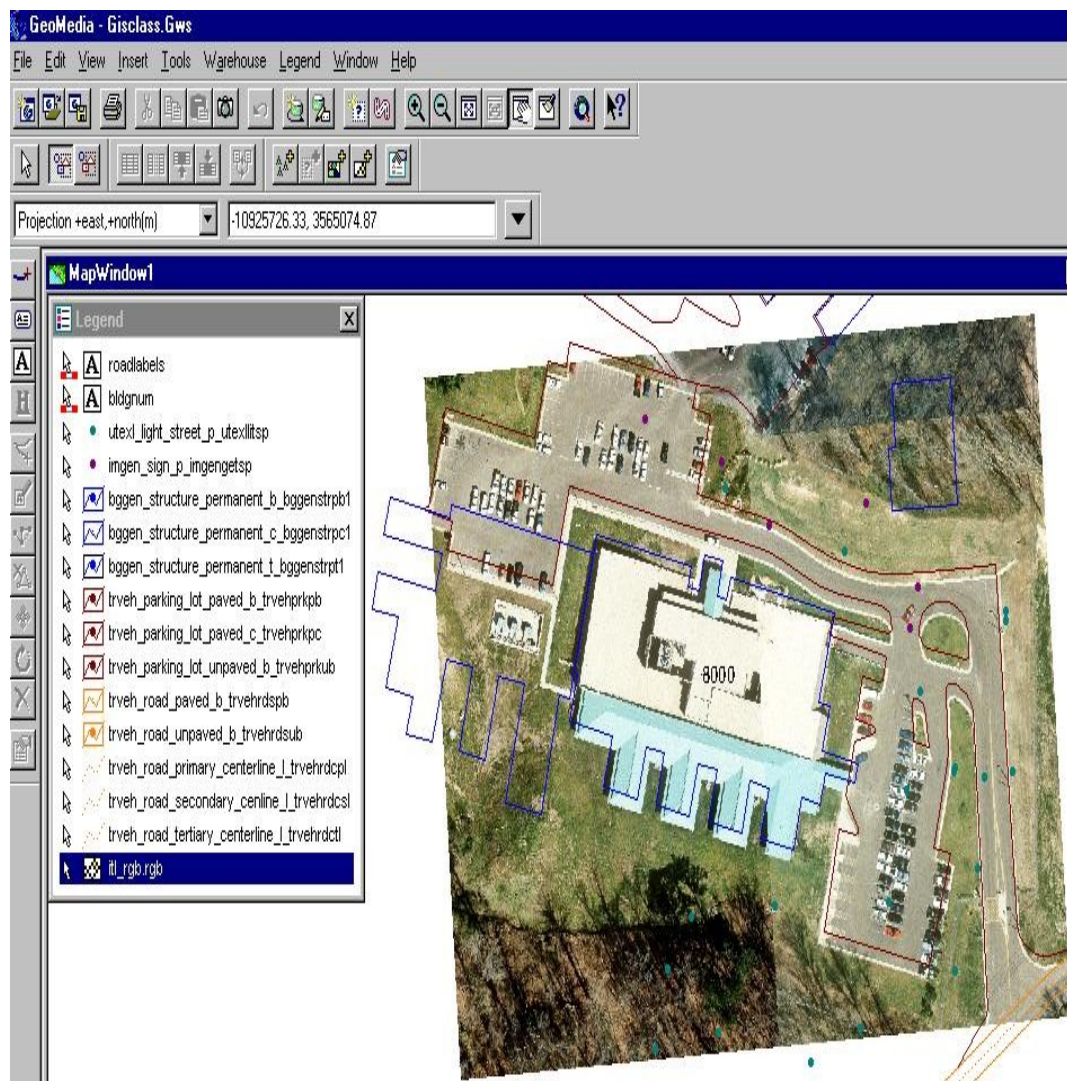
Benefits of Using a GIS Data Standard

- Atchafalaya Basin GIS is SDSFIE compliant.
- New Orleans District (CEMVN) currently uses Intergraph MGE & GeoMedia.
- CEMVN will not lose data investment if they migrate to ESRI ArcGIS (or other GIS software vendor) in future.



Benefits of Using a GIS Data Standard

- GIS for Waterways Experiment Station, Vicksburg, MS based upon SDSFIE.
- Both ESRI ArcView & Intergraph GeoMedia GIS uses data from same SDSFIE compliant Oracle database.



Organizations Around the World have Requested or Downloaded the SDSFIE/FMSFIE



Australia Sweden

Bahrain Japan

Canada China

Chile United
States

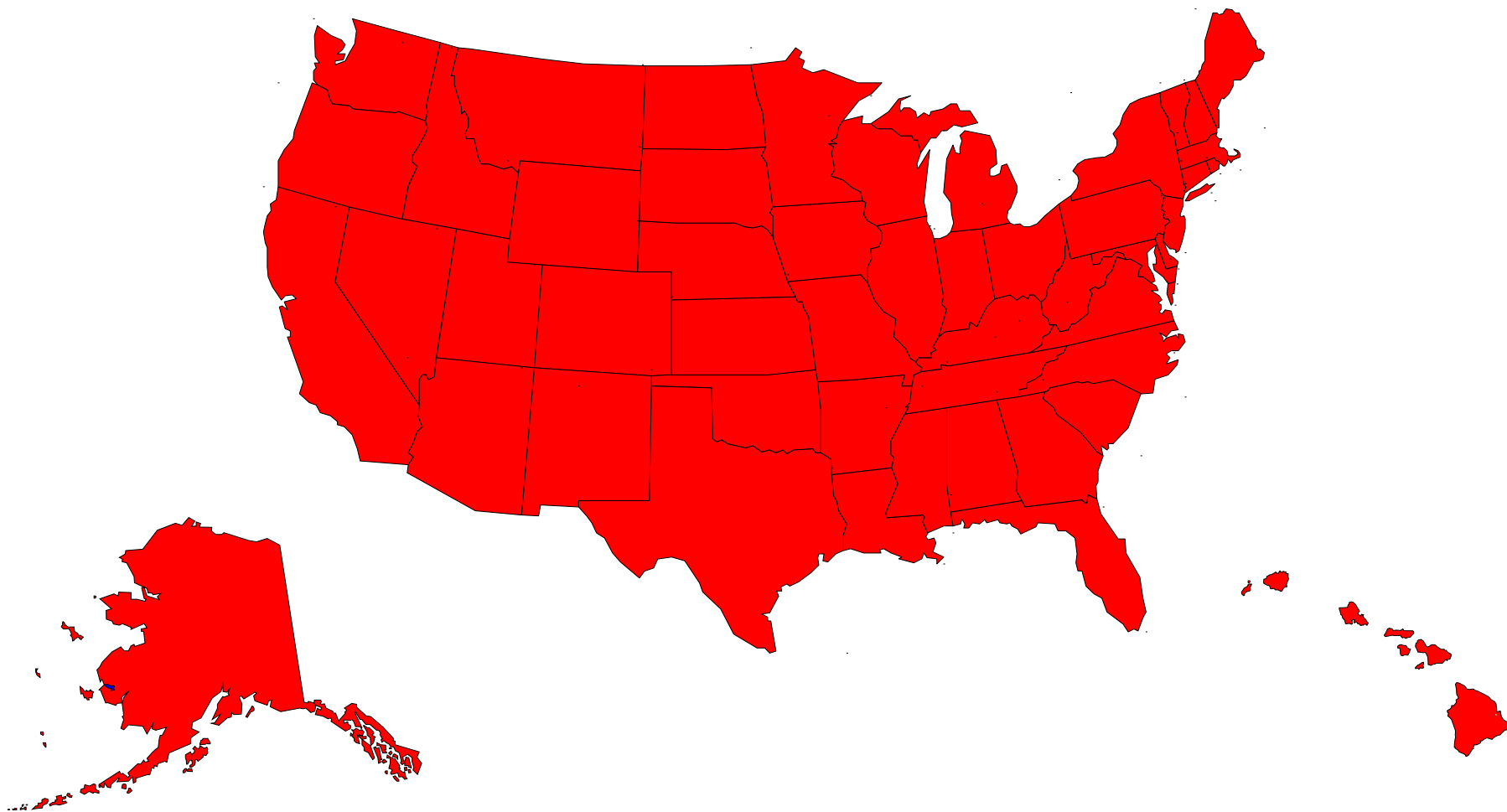
Columbia Malaysia

India Poland

Italy South Africa

England

DoD Organizations in all 50 States Use the SDSFIE/FMSFIE



State Agencies in 20 States Have Requested the **SDSFIE/FMSFIE**



Alaska	Kansas
Arkansas	Massachusetts
Arizona	Maryland
California	Mississippi
Conneticut	Montana
District of Columbia	
Florida	North Carolina
Georgia	North Dakota
Hawaii	Ohio
Indiana	Texas
Wisconsin	

Universities in 22 States Have Requested the SDSFIE/FMSFIE



Arkansas	North Dakota
Colorado	New Jersey
Florida	New Mexico
Illinois	New York
Indiana	Oklahoma
Louisiana	Pennsylvania
Massachusetts	Texas
Minnesota	Utah
Missouri	Virginia
Mississippi	Washington
North Carolina	West Virginia

Local Governments in 30 States Have Requested the **SDSFIE/FMSFIE**



Arizona	Kentucky	Pennsylvania
California	Maryland	South Carolina
Colorado	Maine	Tennessee
Connecticut	Michigan	Texas
Florida	Minnesota	Utah
Georgia	Missouri	Virginia
Hawaii	North Carolina	
Idaho	New York	Washington
Illinois	Ohio	Wisconsin
Indiana	Oklahoma	
Kansas	Oregon	

Spatial Data Standards (SDSFIE) & Facility Management Standards (FMSFIE) - Development History

Spatial Data Standards / Facility Management Standards

Spatial Data Standards for facilities, infrastructure, and environment (SDSFIE) (formerly called Tri-Service Spatial Data Standards (TSSDS) and Spatial Data Standards (SDS)) and Facility Management Standards for facilities, infrastructure, and environment (FMSFIE) (formerly called Tri-Service Facility Management Standards (TSFMS) and Facility Management Standards (FMS)).



PURPOSE

- ♦ Provide a standard for GIS and facility management (CADD and GIS) implementations at Department of Defense installations, Army Corps of Engineers Civil Works activities, and other Government organizations.
- ♦ Provide a nonproprietary standard designed for use with commercially available, off-the-shelf CADD, GIS, and relational database software.
- ♦ Provide a GIS implementation schema for approved Federal Geographic Data Committee Data Standards.



CD-ROM CONTENTS

- ♦ Windows-based SDSFIE/FMSFIE Applications (95, 98, NT, and 2000) Release 2.00 and Tutorial (Installs with SDS/FMS Release 2.00 Installation Program). Applications include the Browser, SQL Generator, Filter Maker, Filter Eraser, Geomedia Builder, Access Builder, and Access Data Creator.
- ♦ SDSFIE Symbol Sets for MicroStation, AutoCad, ArcInfo, and ArcView. (See ArcInfoSym.200, AutoCadSym.200, ArcViewSym.200, and MicroStaSym.200 directories).
- ♦ SDSFIE/FMSFIE Release 2.00 IDEF Models (.pdf and .ert digital format). (See Models.200 directory.)
- ♦ Technical guidance and documentation. See Guidance and Instructions Directories.
- ♦ GPS Tutorial (Compliments of Patuxent River Naval Air Station, Maryland). See GPS Tutorial directory.

Facilities • Infrastructure • Environment

Important contributions have been made by many past and present Department of Defense, other Federal government, State government, local government (city/county), and contractor personnel. All deserve our thanks and appreciation for their contributions to the SDSFIE and FMSFIE development effort. Of special note were the dedication and support of all past and present CADD/GIS Technology Center organizations, including Board of Directors (formerly Executive Steering Group), Corporate Staff (formerly Executive Working Group and Field Technical Advisory Group), Field User Groups (formerly Field Working Groups), and contributing subject matter experts. Special appreciation goes to all reviewers and GIS technical experts who provided invaluable comments and recommendations on this and past releases.

U.S. Army Corps of Engineers • U.S. Army • U.S. Air Force • U.S. Navy • U.S. Marines
 U.S. Coast Guard • Defense Logistics Agency • Environmental Protection Agency
 National Aeronautics & Space Administration • General Services Administration
 State Department • National Institute of Building Sciences

Spatial Data Standards / Facility Management Standards

Spatial Data Standards / Facility Management Standards

Jan 2001

Jan 2001

- **TSSDS Release 1.20 - November 1993.**
- **TSSDS Release 1.40 - August 1995.**
- **TSSDS Release 1.60 - November 1996.**
- **TSSDS Release 1.70 - August 1997.**
- **TSSDS Release 1.75 - January 1998.**
- **TSSDS/TSFMS Release 1.80 - February 1999.**
- **SDS/FMS Release 1.90 - December 1999**
- **SDS/FMS Release 1.95 - April 2000**
- **SDSFIE/FMSFIE Release 2.00 - January 2001**

Spatial Data and Facility Management Standards Design Considerations

- Must be compatible with Commercially Available CADD, GIS, & Relational Database Software.
- GIS and CADD Software include:
 - ARC/INFO - MicroStation - ArcView - Map/World
 - MGE - AutoCAD - GeoMedia - GeoGraphics
- Relational Database Application Software includes:
 - ANSI Standard Structured Query Language (SQL)
 - Informix SQL - Access
 - Oracle SQL
- Operating Systems include:
 - UNIX
 - Windows 95, 98, NT, 2000, ME

Spatial Data and Facility Management Standards Application

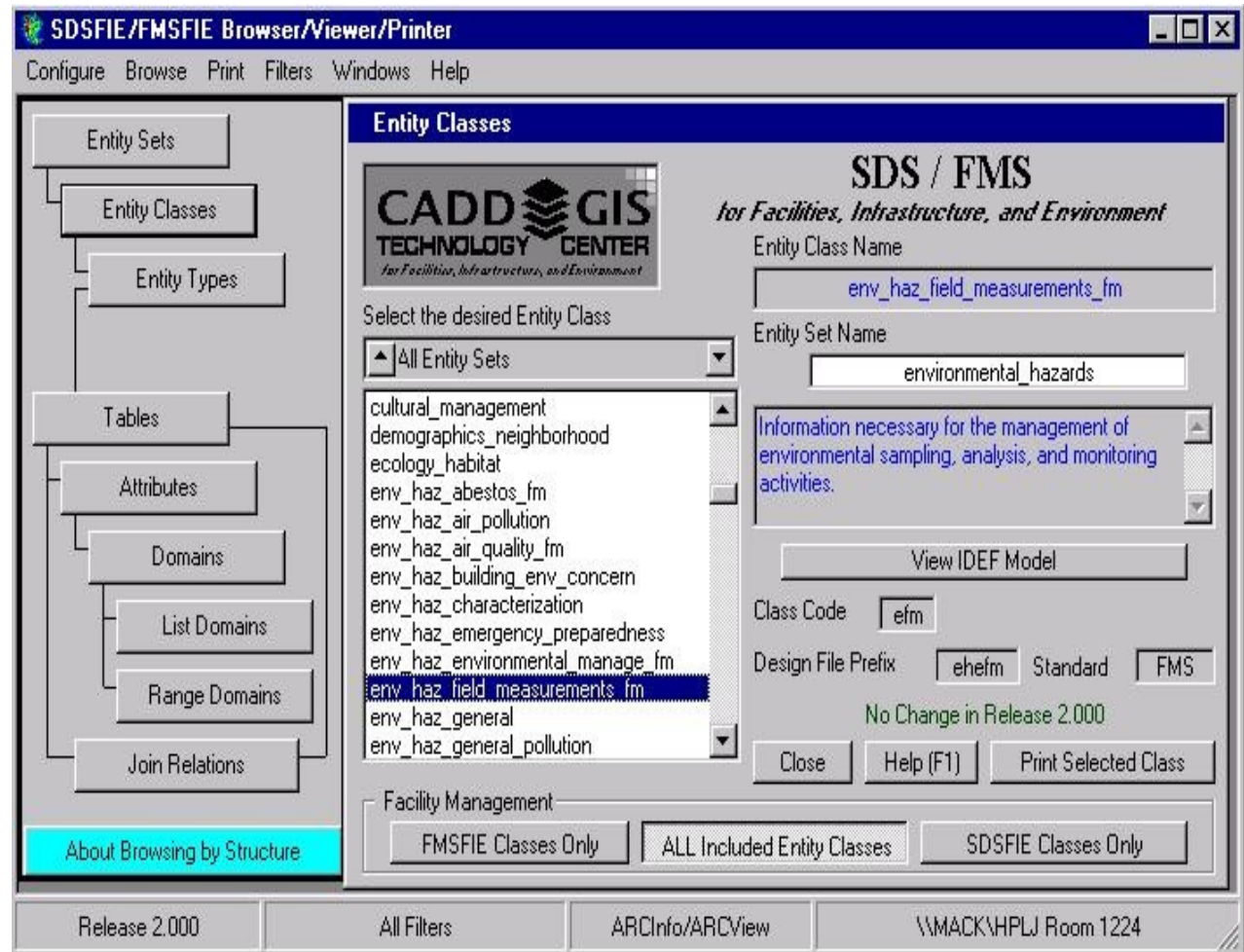
Self-contained Microsoft Visual Basic (32 bit)
Application for Windows Operating Systems.

- Runs on Personal Computer with Windows 98, NT, ME, or 2000 Operating System.
- No Additional Software Required.
- Distributed on CD-ROM.
- Updated each Year.
- Most current Release is available for download from
CADD/GIS Technology Center Internet Web Site
<http://tsc.wes.army.mil>

SDSFIE/FMSFIE Software Application - Browser

SDSFIE/FMSFIE Browser Software Application:

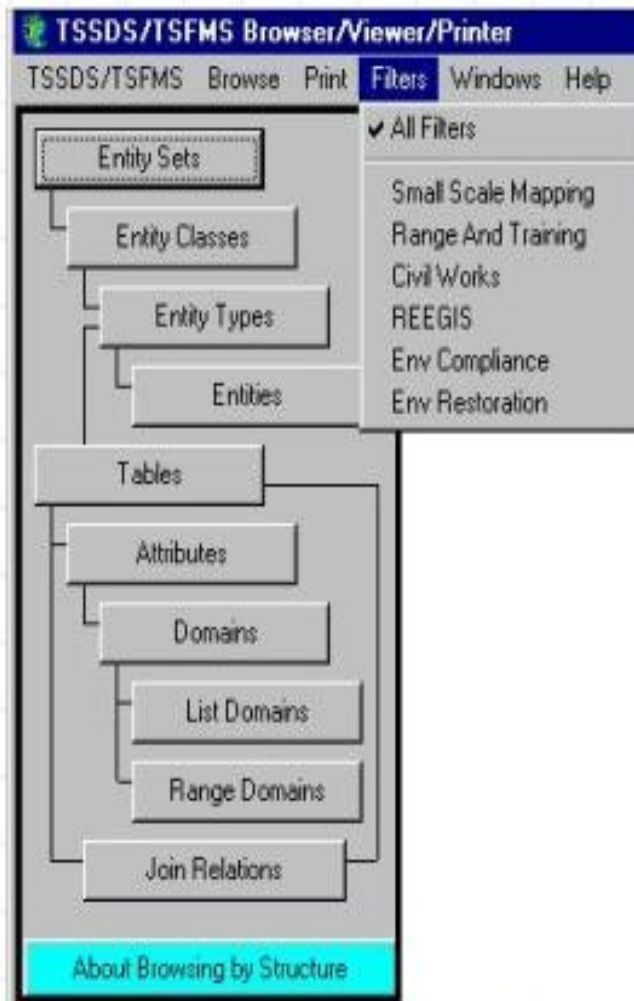
- Provides a tool for viewing & printing the various components of the Standards.
- Permits the User to view/print Standard based upon their specific CADD/GIS software.
- Permits the User to view/print either: (1) entire Standard, (2) pre-defined "filter", or (3) User's custom filter.



Spatial Data Standards (SDSFIE) & Facility Management Standards (FMSFIE) - Filters

“Filter” Concept and Capability was first introduced with the TSSDS/TSFMS Release 1.80.

- “Filters” are a subset of the SDSFIE/FMSFIE.
- “Filters” can be “Pre-Defined” (i.e., defined by a User Group and provided by the Center with the SDSFIE/FMSFIE Release) or “User-Defined” (i.e., defined by a User through use of the SDSFIE/FMSFIE Filter Maker Application).
- SDSFIE/FMSFIE contains an enormous amount of detail and information. Most GIS implementations use a subset of the SDSFIE/FMSFIE. “Filters” simplify development of a SDSFIE/FMSFIE compliant GIS through the identification and use of a defined SDSFIE/FMSFIE subset.



SDSFIE/FMSFIE Software Application - Filter Maker

SDSFIE/FMSFIE Filter Maker Software Application:

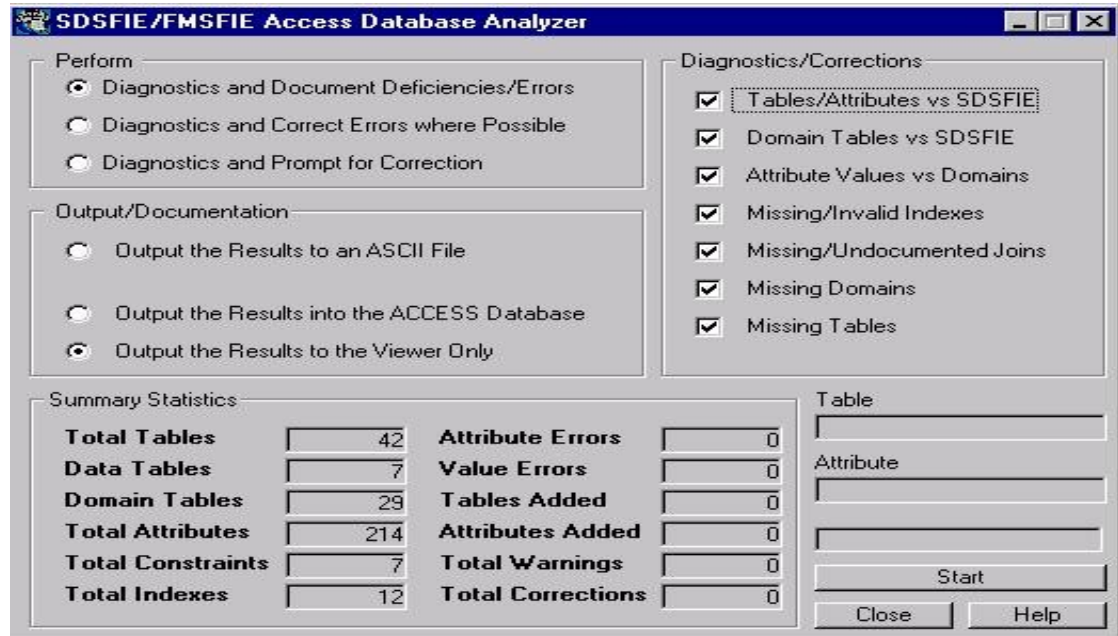
- Provides a tool which permits the User to define their own subset of the SDSFIE/FMSFIE for use in GIS development.



SDSFIE/FMSFIE Software Application - Access Builder

SDSFIE/FMSFIE Access Builder Software Application:

- Provides a tool which permits the User to build SDSFIE/FMSFIE compliant Microsoft Access 97 attribute & domain tables, complete with joins.
- Provides a tool which permits the User to check and run diagnostics on SDSFIE/FMSFIE compliant Microsoft Access 97 database tables.



SDSFIE/FMSFIE Access Database Analyzer

Perform

- ☒ Diagnostics and Document Deficiencies/Errors
- ☐ Diagnostics and Correct Errors where Possible
- ☐ Diagnostics and Prompt for Correction

Output/Documentation

- ☐ Output the Results to an ASCII File
- ☐ Output the Results into the ACCESS Database
- ☒ Output the Results to the Viewer Only

Summary Statistics

Total Tables	42	Attribute Errors	0
Data Tables	7	Value Errors	0
Domain Tables	29	Tables Added	0
Total Attributes	214	Attributes Added	0
Total Constraints	7	Total Warnings	0
Total Indexes	12	Total Corrections	0

Diagnostics/Corrections

- ☒ Tables/Attributes vs SDSFIE
- ☒ Domain Tables vs SDSFIE
- ☒ Attribute Values vs Domains
- ☒ Missing/Invalid Indexes
- ☒ Missing/Undocumented Joins
- ☒ Missing Domains
- ☒ Missing Tables

Table:

Attribute:



SDSFIE/FMSFIE

Open Action Help

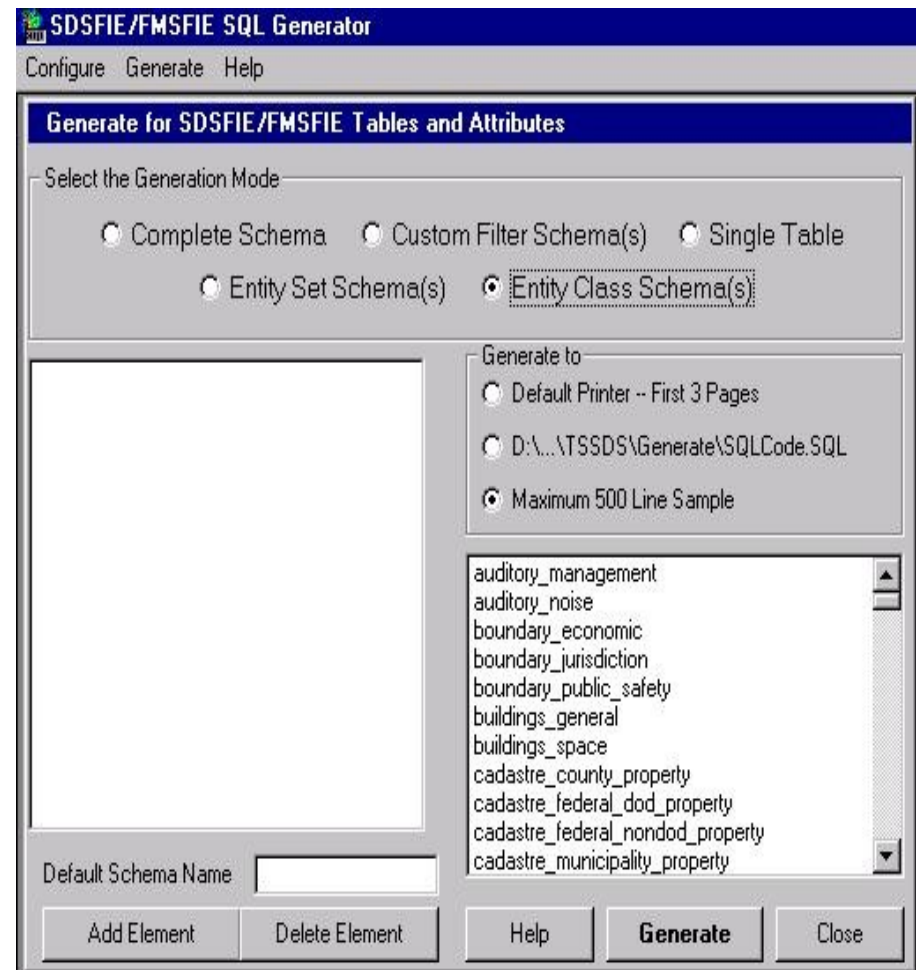
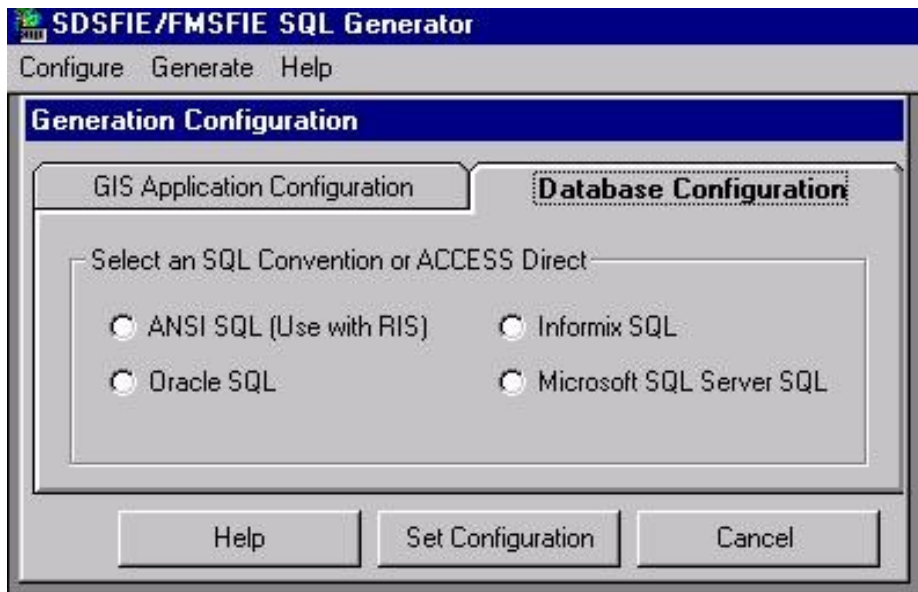
Tables Domains Candidates

- ehsitaoc
- ehsitbrn
- ehsitcfc
- ehsitepa
- ehsitfac
- ehsitfud
- ehsitirp

SDSFIE/FMSFIE Software Application - SQL Generator

SDSFIE/FMSFIE SQL Generator Software Application:

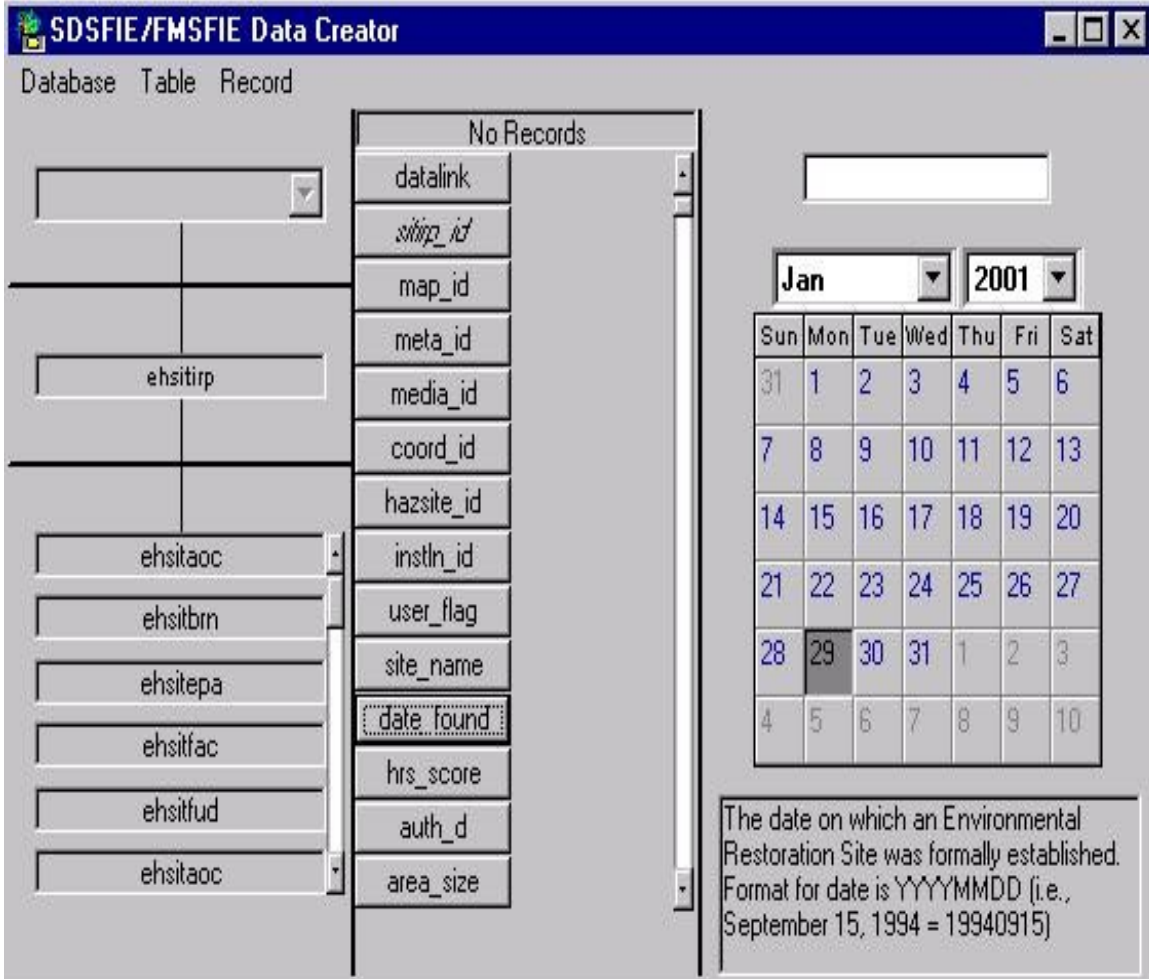
- Provides a tool which permits the User to build SDSFIE/FMSFIE compliant ANSI SQL, Oracle SQL, Informix SQL, and SQL Server databases.



SDSFIE/FMSFIE Software Application - Data Creator

SDSFIE/FMSFIE Data Creator Software Application:

- Provides a tool which permits the User to manually input data in SDSFIE/FMSFIE compliant Microsoft Access 97 database tables.



SDSFIE/FMSFIE Data Creator

Database Table Record

Tables:

- ehsitirp
- ehsitaoc
- ehsitbrn
- ehsitepa
- ehsitfac
- ehsitrud
- ehsitaoc

Fields:

- datalink
- slitp_id
- map_id
- meta_id
- media_id
- coord_id
- hazsite_id
- instln_id
- user_flag
- site_name
- date found
- hrs_score
- auth_d
- area_size

Calendar:

Jan 2001

Sun	Mon	Tue	Wed	Thu	Fri	Sat
31	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	1	2	3
4	5	6	7	8	9	10

The date on which an Environmental Restoration Site was formally established. Format for date is YYYYMMDD (i.e., September 15, 1994 = 19940915)

- **Entity Sets**
 - **Entity Classes**
 - **Entity Types (Entities)**
 - SDS Geospatial Features (i.e. map objects).
-
- **Attribute Tables**
 - Database Tables containing attributes (data about the SDSFIE Geospatial Features and FMSFIE data).
 - **Domain Tables**
 - Common for SDSFIE & FMSFIE.

SDSFIE/FMSFIE Data Model Organization

- **Entity Sets -**
 - Broad grouping for data management purposes.
- **Entity Classes -**
 - Grouping of data within each Entity Set for Data Management Purposes.
- **Entity Types -**
 - Grouping of SDS Geospatial Features (i.e., items that appear graphically on a map or drawing). Grouped within each Entity Class.
- **Entities -**
 - Items that appear graphically on a map or drawing. Grouped within each Entity Type. Each Entity Type may have one or more Entities.
- **Attribute Tables -**
 - Relational database tables containing attribute data. Grouped within each Entity Class.
- **Domain Tables -**
 - Contains lists of “valid” or “permissible” values for specific attributes in an Attribute Table.

CADD/GIS/FM Standards Data Model - Current Model

Spatial Data Standards (SDSFIE)
Entity Sets

A/E/C CADD Standards Disci
Codes

SDSFIE Entity Cla

FMSFIE Entity Classes

A/E/C Model File Type

SDSFIE Entity Types

A/E/C Level

SDSFIE Entities

A/E/C Level/Layer Descripti

A/E/C Symbol Name

SDSFIE Attribute Tables

FMSFIE Attribute Table

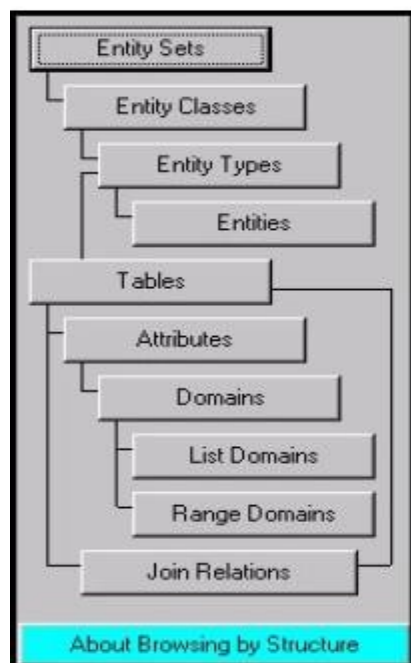
A/E/C Attribute Tables

Domain Tables &
Domain Values

CADD/GIS/FM Standards Compliant Database = One Integrated Relational Database

Size and Complexity - SDSFIE/FMSFIE Release 2.000

Size and Complexity - SDSFIE/SDSFIE Release 2.000



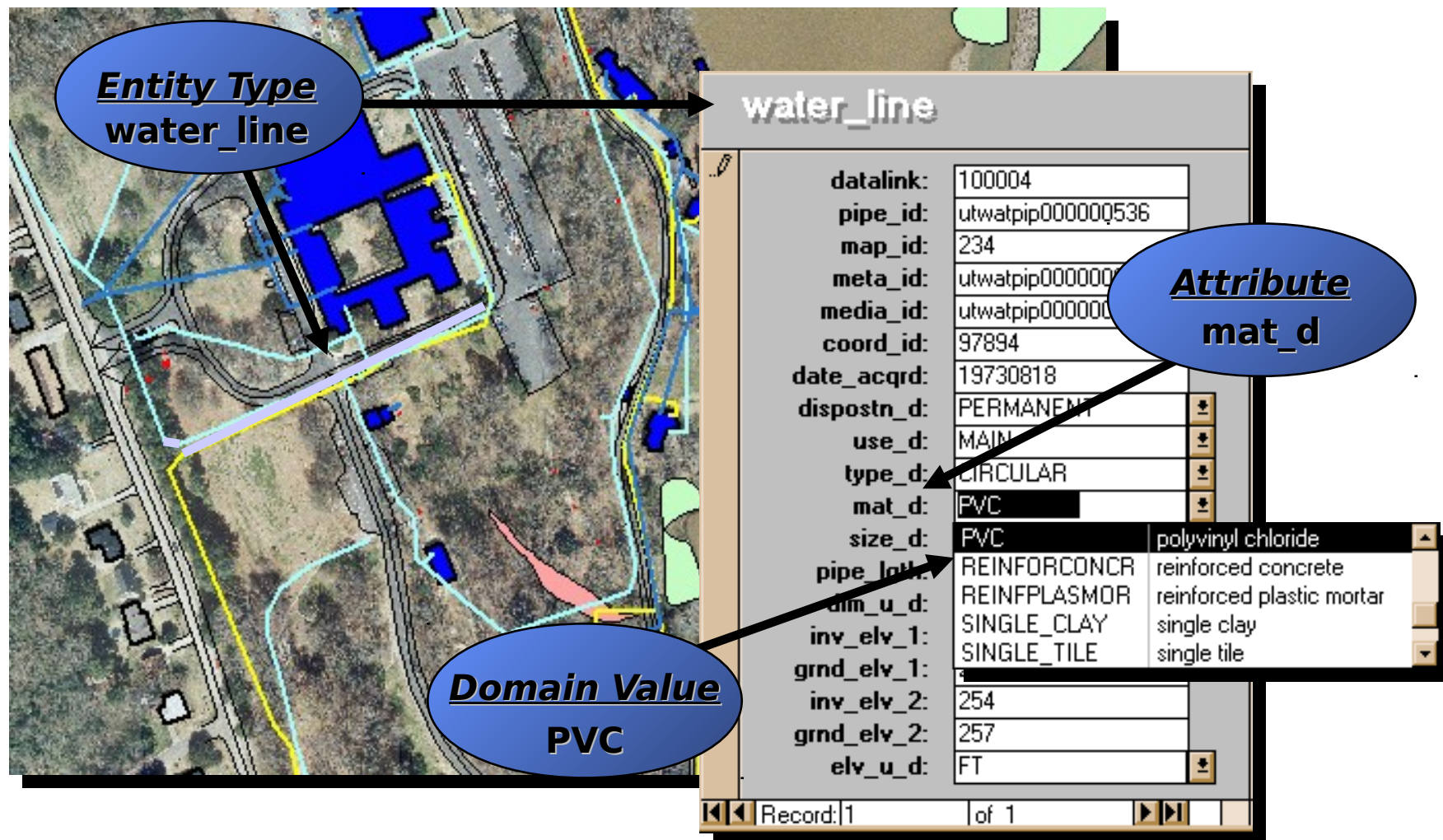
26	Entity Sets
181	Entity Classes
1,006	Entity Types
5,453	Entities (CADD & CADD Based GIS)
1,014	Attribute Tables (Database Tables)
25,844	Attributes (Fields in Tables)
959	Domain Tables (List & Range)
21,542	List Domain Values
18	Range Domains
8,149	Relational Database Join Relationships

Spatial Data Standards

Data Model

Entity Set	Entity Class	Entity Type	Attribute	Domain
Utilities	Water System	SDTS (FIPS 173) Data Model		
	Natural Gas			
	Wastewater			
		Drain Sump		
		Grease Trap		
		Septic Tank	Capacity	
			Age	
			Composition	Concrete
				Fiberglass
				Steel

Spatial Data Standard Data Model



Entity Type
 water_line

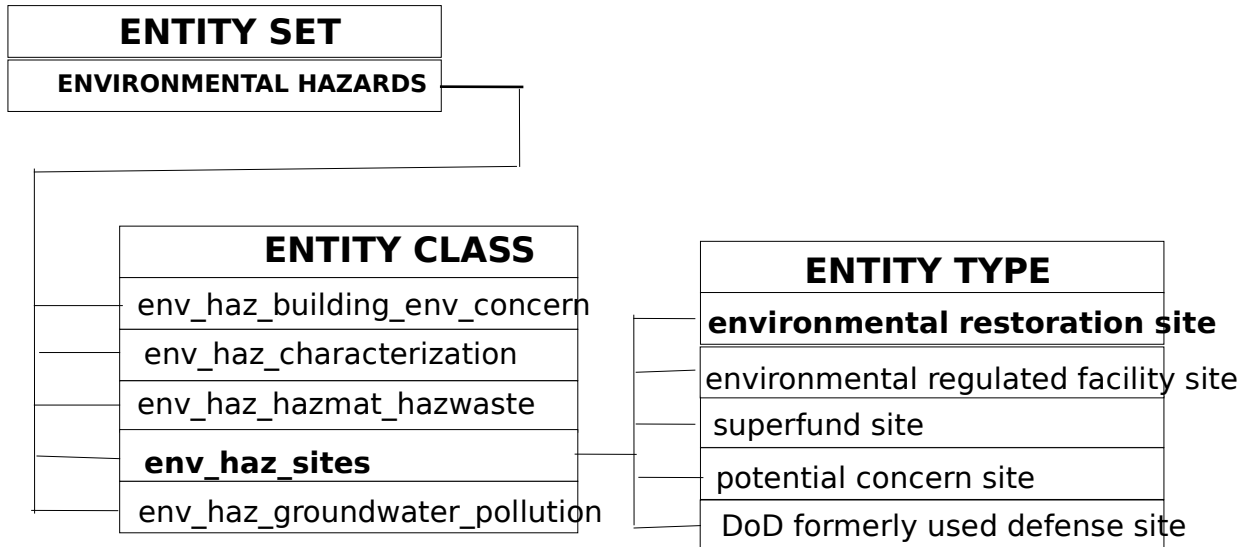
Attribute
 mat_d

Domain Value
 PVC

water_line		
datalink:	100004	
pipe_id:	utwatpip000000Q536	
map_id:	234	
meta_id:	utwatpip000000	
media_id:	utwatpip000000	
coord_id:	97894	
date_acqrd:	19730818	
dispostn_d:	PERMANENT	
use_d:	MAIN	
type_d:	CIRCULAR	
mat_d:	PVC	
size_d:	PVC	polyvinyl chloride
pipe_mth:	REINFORCONCR	reinforced concrete
dim_u_d:	REINFPLASMOR	reinforced plastic mortar
inv_elv_1:	SINGLE_CLAY	single clay
grnd_elv_1:	SINGLE_TILE	single tile
inv_elv_2:	254	
grnd_elv_2:	257	
elv_u_d:	FT	

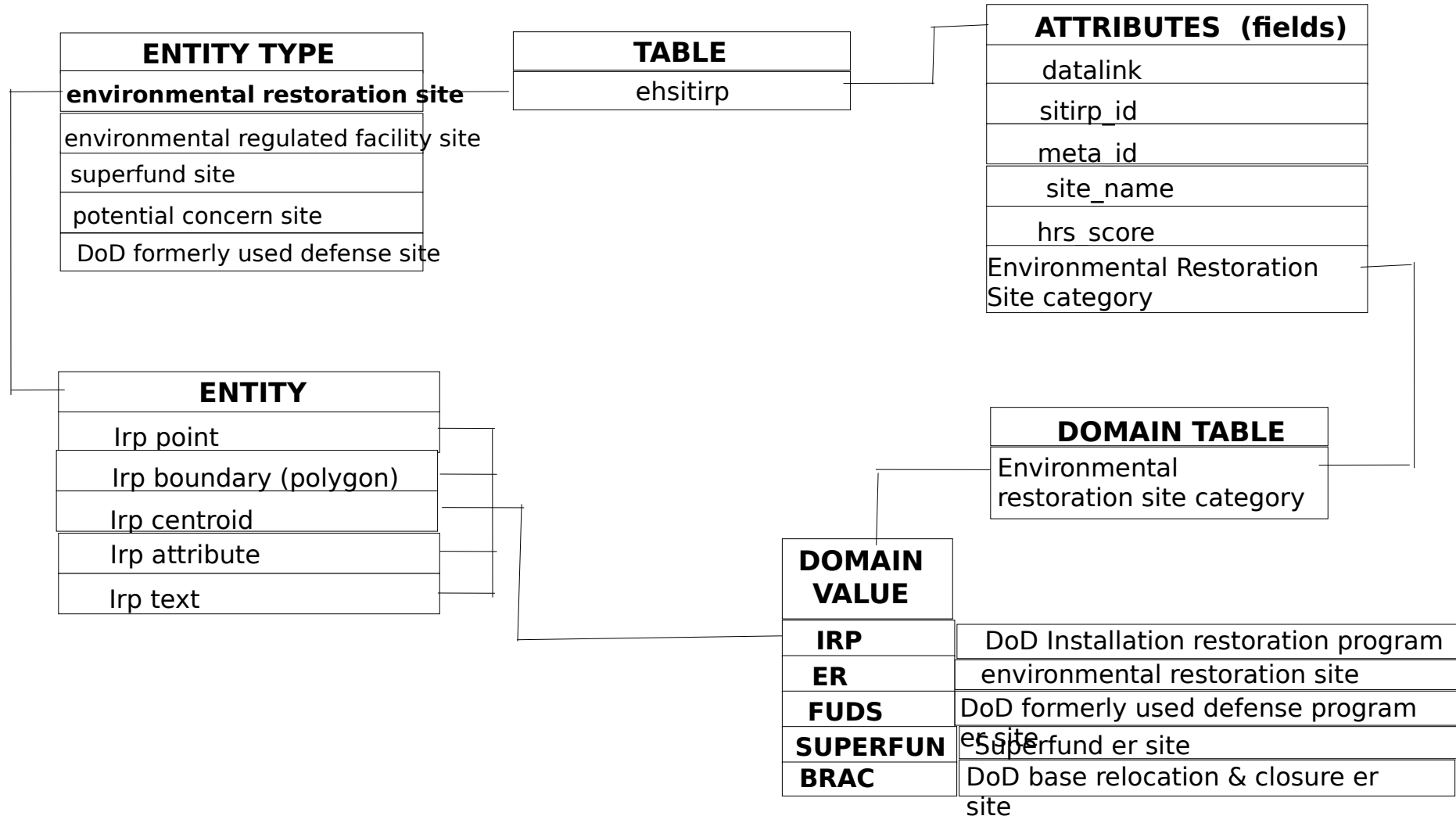
Record: 1 of 1

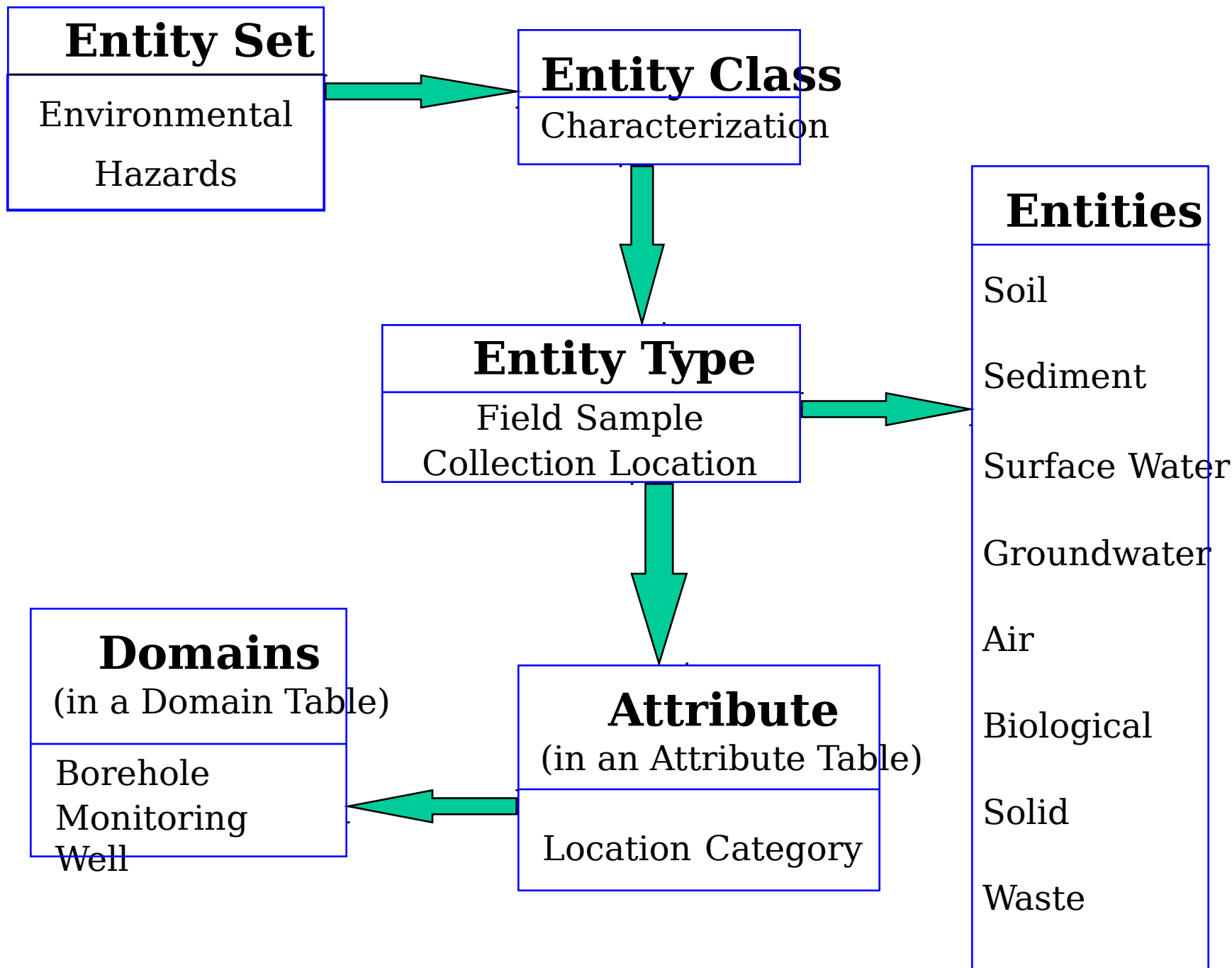
Example Structure

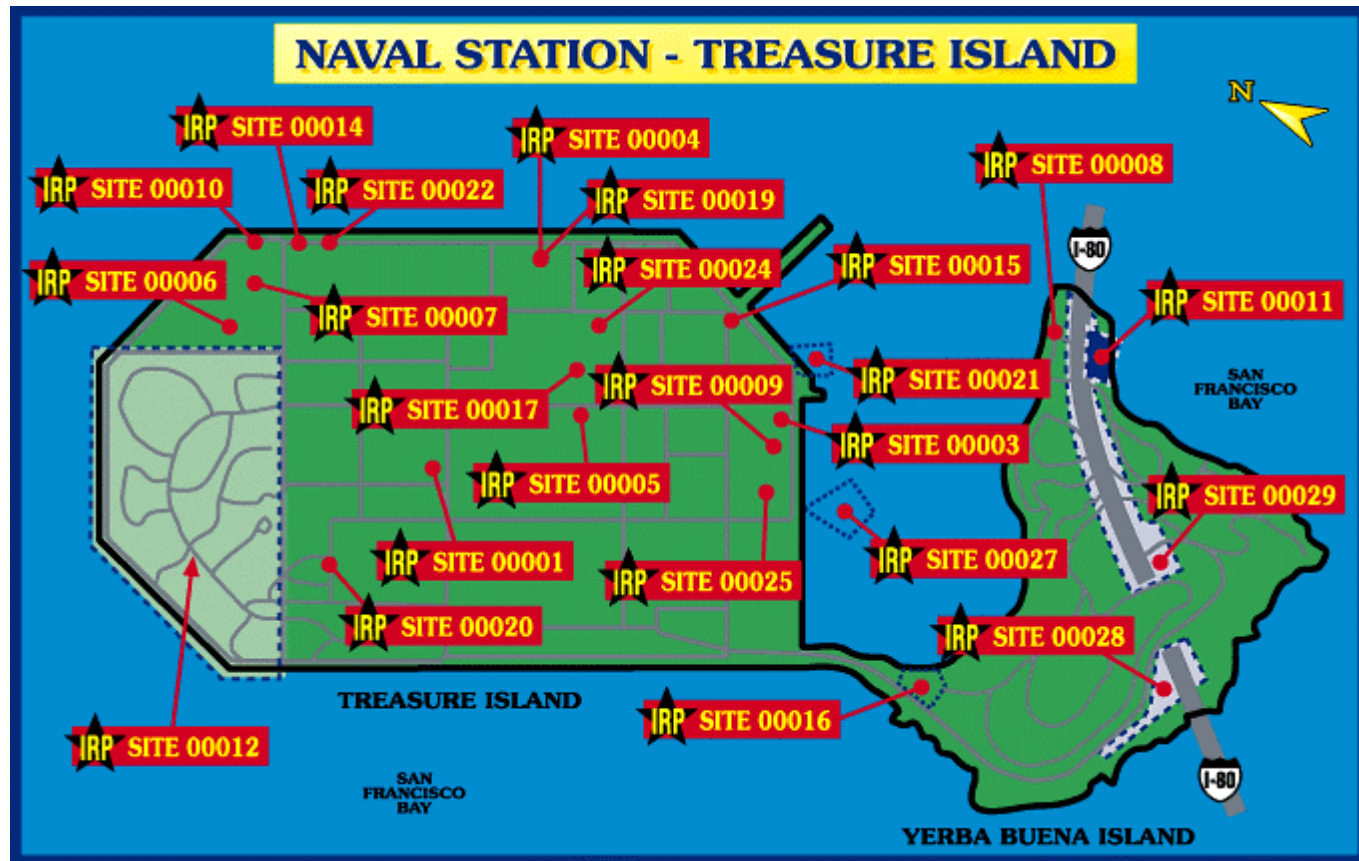


Environmental Restoration Site - A geographic area where an active environmental study or project is underway to remediate pollutants located in the soil, sediment, surface water, or groundwater.

Example Structure







DoD Installation Restoration Program (IRP) Sites are depicted as point features (with an associated symbol) on this map.

The same IRP site might be depicted as a boundary (polygon) feature on a large scale map with a scale of 1 inch = 100 feet.

Environmental Compliance Standards

Polychlorinated Biphenyls (PCBs)

Lead Paint

Indoor Air Quality

Hazardous Waste

Hazardous Materials

Air Quality & Emissions

Asbestos Containing Materials

Regulated Storage Tanks

Surface Water Discharges (NPDES Permits)

Toxic Substances

Environmental Sites

Environmental Restoration GIS Standards

Boreholes

Wells

**Environmental Field Sample Collection, Analysis,
& Results**

**Environmental Sites (FUDS, IRP, Superfund,
Brownfields)**

Environmental Remediation

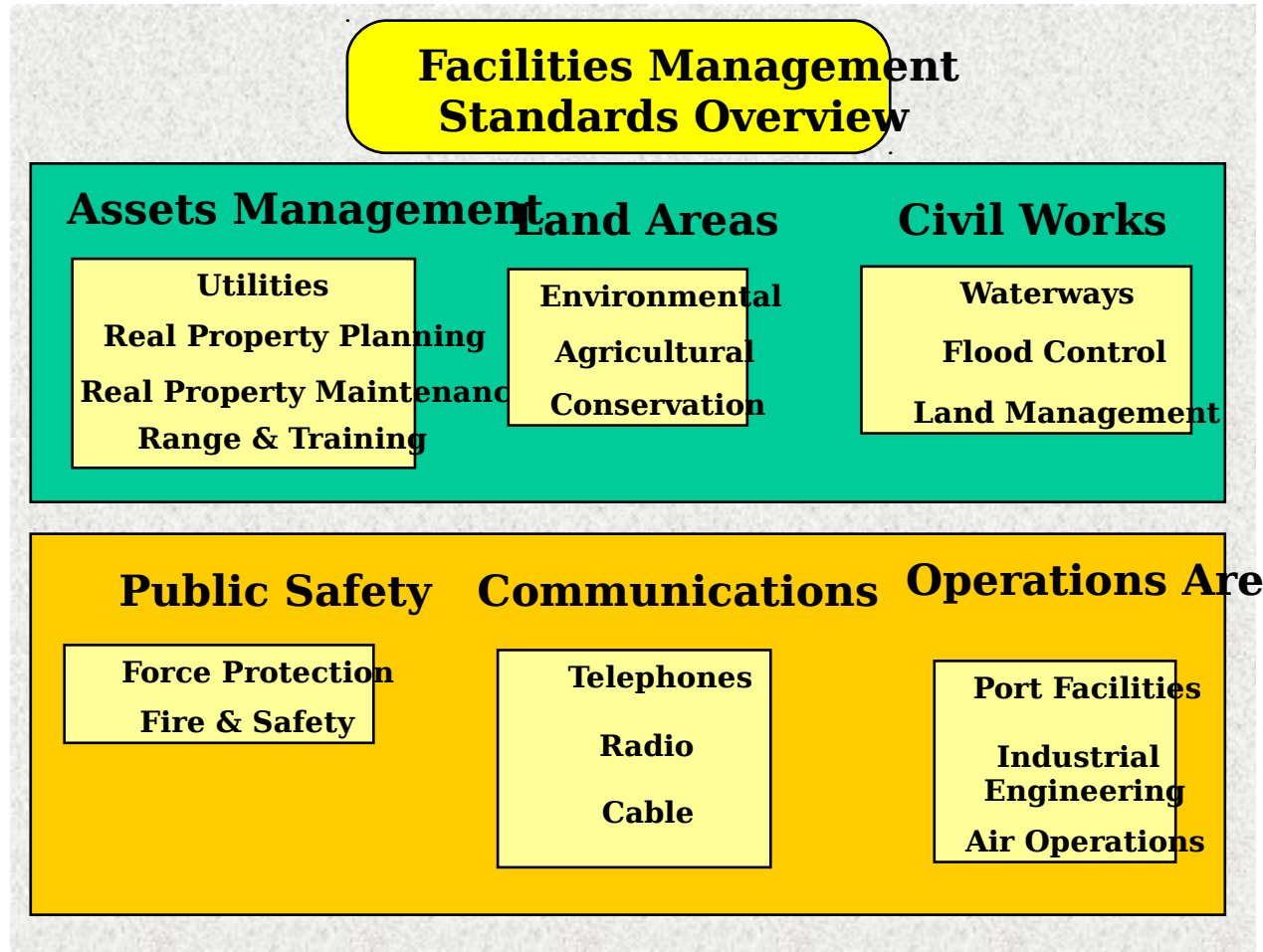
SDSFIE & FMSFIE Current & Future Development

- **Began Working with ESRI in FY2000 in development of a Prototype Implementation of SDSFIE using ARCINFO 8.x GIS Software.**
- **Are developing CADD/GIS Object Standards.**
- **Have begun migration of the Facility Management Standards (to be called FMSFIE) to a “transactional” (i.e., more relational structure which integrates better with FM processes data model.**

96.015 - Facility Management Standards (FMSFIE) - Focus Areas for New “Transactional” Data Model Development

Focus areas This is within the Facilities, Infrastructure and Environment Business Plan for the Center

Work with the **Associated areas** as the need to support the **Focus area** development.



CADD/GIS/FM Standards Data Model – With Transactional FMSFIE

